The IRON AGE
April 25, 1957
The National Metalworking Weekly

Foundrymen Take Off After Big Market P. 59

New Pointers On CO_2 Molding — P. 99

Will Senate Probe Blunt Labor's Drive? — P. 62

Digest of the Week P. 2-3

LET THE STEEL WITH THE "BUILT-IN" PRODUCTIVITY HELP YOU

To produce the shovels, the trucks, the graders and other earth-moving giants, required to build America's 41,000 miles of badly needed roads, will provide manufacturers with their greatest peacetime challenge.

Aristoloy Leaded Steels, with their freer machining qualities, can help you contribute to this effort. Leaded alloy and carbon cut clean, yielding finer finish at faster feeds and speeds. Tools last longer, and many companies have been able to eliminate final machining.

With a complete line of A.I.S.I. or S.A.E. standard analyses which can be furnished leaded, Copperweld stands ready to help you.

COPPERWELD STEEL COMPANY
Steel Division • Warren, Ohio

ARISTOLOY STEELS

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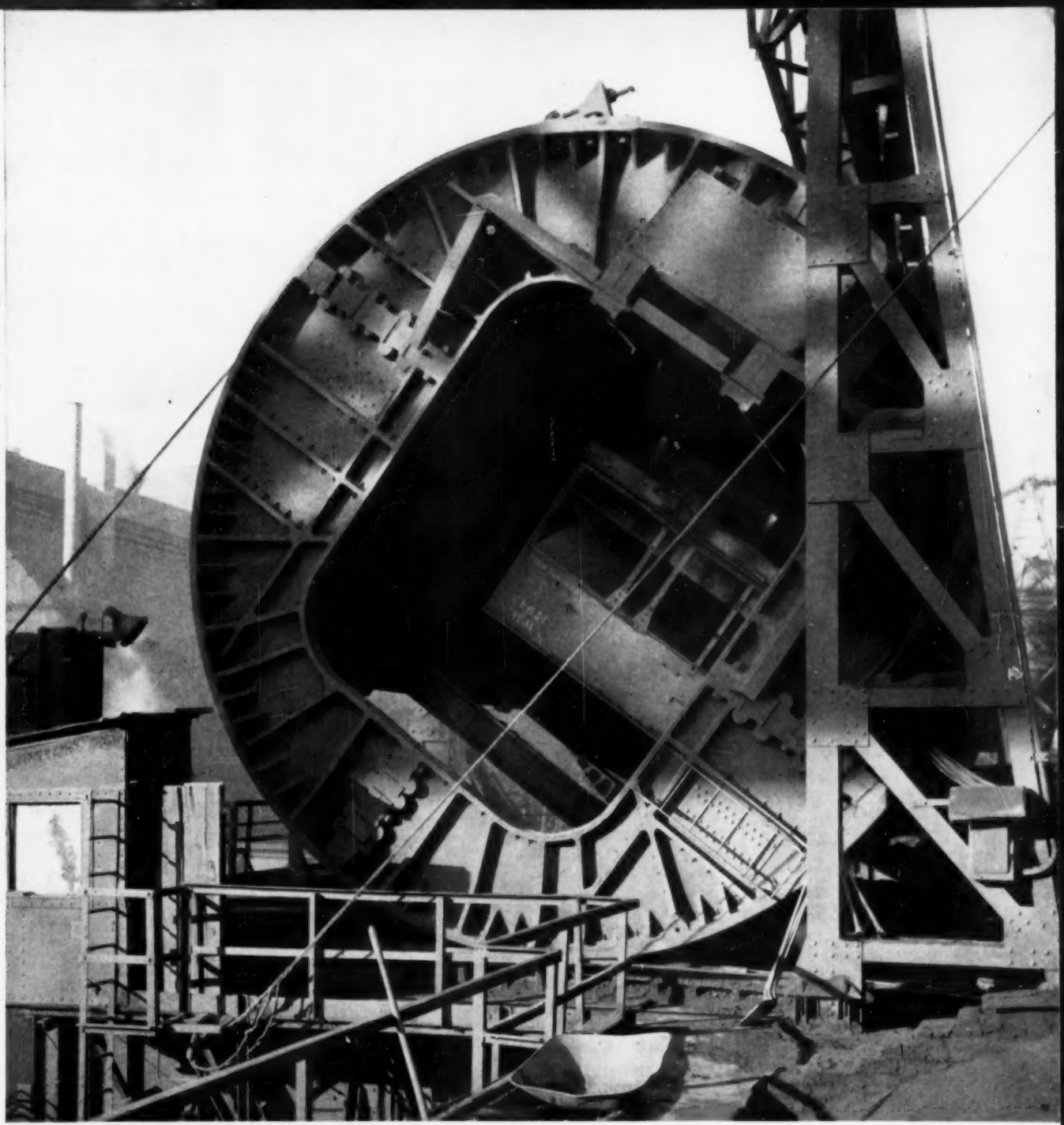

THIS ROTARY CAR DUMPER can handle two 90-ton hopper cars simultaneously every four minutes. Main members of the unloader were made of Mayari R high-strength, low-alloy steel to resist fatigue caused by vibration, and to combat the corrosive effects of industrial atmosphere. The high strength of Mayari R, together with its corrosion-resistance, excellent welding properties, superior paint-adherence and other qualities have made it the choice for a wide variety of applications. Our Catalog 353 discusses Mayari R in complete detail.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mayari R...High-Strength, Corrosion-Resisting Steel

BETHLEHEM STEEL

THE IRON AGE
Chestnut and 56th Sts.
Philadelphia 39, Pa.
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The IRON AGE

April 25, 1957—Vol. 179, No. 17

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NEWS DEVELOPMENTS

Senate Probe Has Put Labor On the Spot

Revelations of racketeering and loose spending in some unions has backed organized labor into a corner. But don't expect these scandals to ease your collective bargaining problems. **P. 62**

Steelmakers To Face Congressional Probe

Two Congressional committees are out to investigate the steel industry. "Administered prices" are a principal target. But many believe it will be just a hunting expedition for politicians. **P. 64**

Imports Threaten Wire Products Market

Barbed wire and nails are hardest hit by cheap foreign wire. But

other products face the same threat. Overall, wire tonnages look deceptively good, but there's trouble ahead. **P. 65**

Introduce Your Plant to the Area's Students

When Selas Corp. moved to its new suburban location it resolved

Metalworking

FLYING FOUNDRYMAN: Air service, as offered by this Dalton Foundry salesman, is one of many marketing tools being adopted by a growing number of foundries. They find modern marketing is paying off in more sales. **P. 59**

to be a really good neighbor. The firm's program provides books, part-time work for students. **P. 68**

Labor's New Troubles In Washington

Before the Senate hearings, labor had hoped for favorable legislation from a Democratic Congress. Now, goal is to hold the line. **P. 81**

FEATURE ARTICLES

New Pointers Offered On CO_2 Molding.

Small quantities of low-cost organic binders, added to molding sands prior to the addition of water glass, can appreciably strengthen CO_2 cured molds. Maximum strength of molds is obtained within 20 to 30 seconds of gassing time. These and other points were brought out in a practical test program recently completed. **P. 99**

Brazed Tubing Bends To Many Product Needs

Copper-brazed steel tubing, a commercial unknown 25 years ago, has found its way into scores of products. But fabricating it—economically—can be quite a trick. This major tubing shop has worked up some ingenious setups. **P. 102**

Shave And Gage Cluster Gears In Automated Setup

Gear manufacturing is one of the most fertile areas for automation. One of latest ideas is this fully automatic setup for shaving and gaging gear clusters. **P. 106**

Alloy Plating: Which Way Is It Headed?

Despite certain limitations, alloy plating is stirring high interest as a product finish. Economics favors co-deposition over plating with single metals in many instances. Research, improved techniques and materials all help. **P. 112**

Keep Plant Modernization Within Your Budget

Plant modernization doesn't necessarily mean new buildings and equipment. Restore old buildings, fit standard machines into well-planned, integrated setups and you achieve the same end. **P. 108**

MARKETS & PRICES

Studebaker-Packard Gains Ground In Comeback Fight

Without fanfare, Studebaker-Packard is making headway. A new economy car is in the works for 1958. And parent Curtiss-Wright is working out a foreign car deal with Daimler-Benz. **P. 76**

Farwest Construction Level Will Remain High

Building industry in the area is holding up much better than in the rest of the nation. And outlook is for more of the same. It's good news for supplier firms. **P. 83**

Automation Must Pay Its Way

The days when automatic devices were more of a fad than an economy are gone. Customers will no longer buy unless they can slash costs. Chrysler has a new machine which it says is required to meet current demand. **P. 85**

Fabrciators Forecast Record Year

Construction order backlogs are still growing. They point to a record year for fabricators of structural steel. Mills are adding to their structural capacity. **P. 70**

Steel Market Lacks Much-Needed Spark from Automotive

There are signs of a slight pick-up in automotive ordering of steel this week. But the volume is not heavy enough to give the needed shot-in-the-arm. **P. 139**

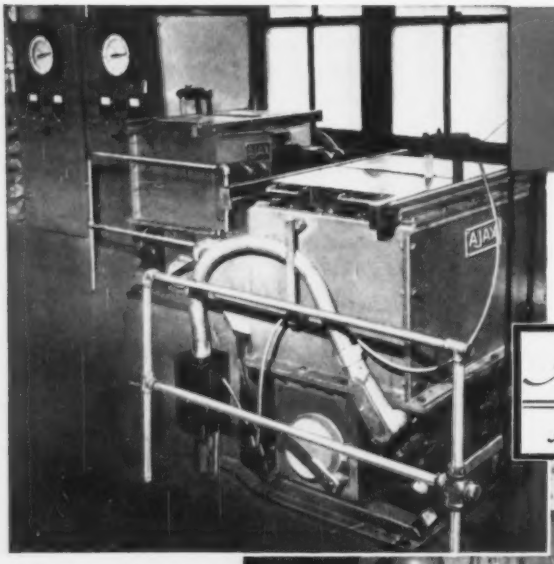
NEXT WEEK

How to Trim Production Paperwork Costs

While production methods are constantly improving, record keeping appears to be standing still. Next week's feature tells how several companies dug out from under mountains of paperwork.

New Hardening Process Uses 'Glow Discharge'

The newest surface hardening process to come out of Europe—glow discharge nitriding—does its job without use of conventional furnace equipment. Next week's technical feature analyzes this and other novels facets of the new method. It is beginning to attract attention.



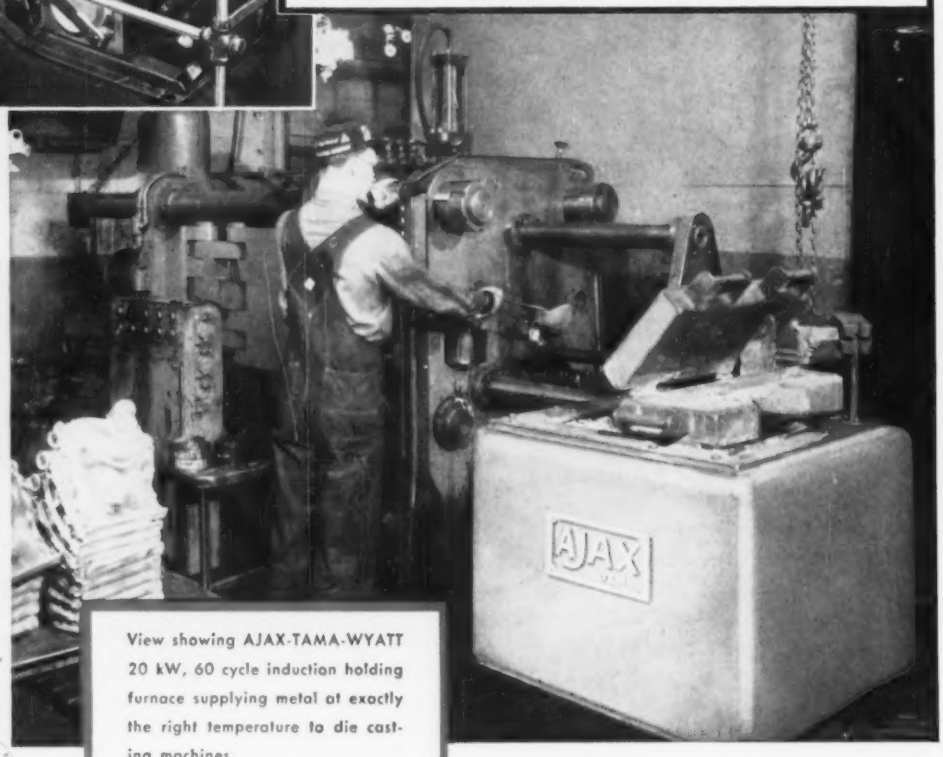
AJAX INDUCTION FURNACES

mean Higher Quality Castings for...

Advance
TOOL & DIE CASTING COMPANY

Aluminum DIE CASTINGS *Zinc Base*

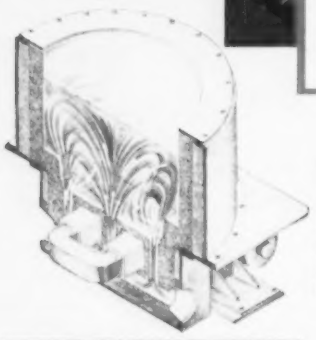
View above shows AJAX melting furnaces, with control cabinets in background.



View showing AJAX-TAMA-WYATT 20 kW, 60 cycle induction holding furnace supplying metal at exactly the right temperature to die casting machines.

The Furnace That Stirs Itself...

The sectional view below shows the twin-coil stirring action of the 100 kW, 60 cycle AJAX Induction Furnace. Heat induced in the secondary channels below is conveyed throughout the melt by electro-magnetic circulation, as shown by the arrows.



Inherent stirring action of these furnaces has proved most valuable to ADVANCE TOOL & DIE CASTING CO., Milwaukee, Wisc. In full operation for 4 years, the most important result of the use of these furnaces is higher quality die cast aluminum parts. The alloy is held in uniform solution, resulting in elimination of oxides, reducing hard spot trouble in secondary machining to a negligible factor. Temperature of the melt is held at 1170° F. through on-off control of the low power circuit. Working conditions are made more comfortable because of low heat losses. The units take up very little floor space.

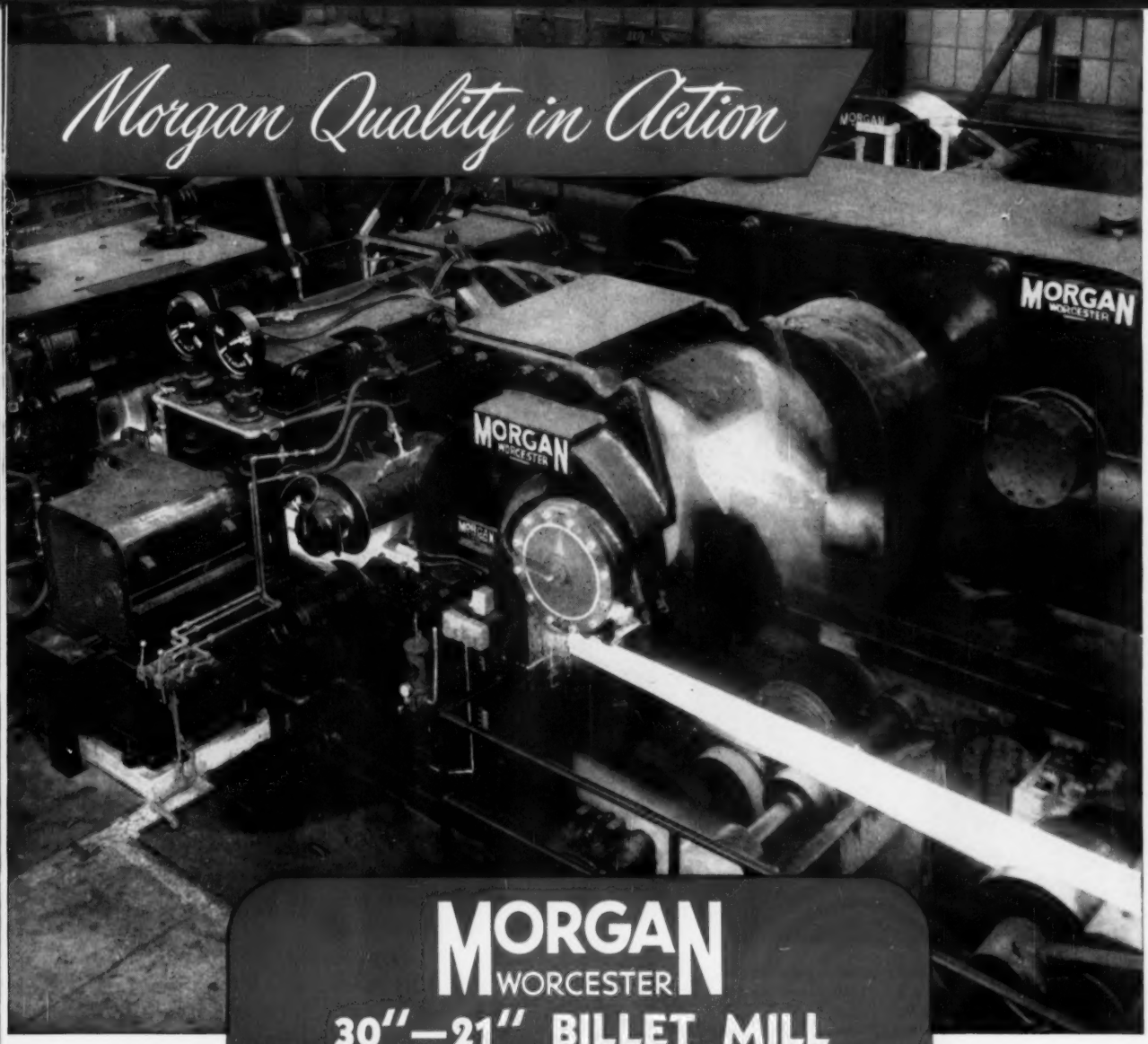
AJAX

LINE FREQUENCY
INDUCTION MELTING FURNACES

AJAX ENGINEERING CORP.
TRENTON 7, NEW JERSEY

Associated Companies
Ajax Electric Company — Ajax Electrothermic Corp.

Morgan Quality in Action



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30″—21″ BILLET MILL

with No. 5 Electric Flying Shear in Action

Every Morgan Mill is developed by highly skilled technical engineers to answer the exacting demands of mass production. Morgan introduced the first successful continuous rolling mill in this country—and has consistently maintained leadership in producing quality, high production mills in this country and abroad.

MORGAN CONSTRUCTION CO.
WORCESTER, MASSACHUSETTS

ROLLING MILLS MORGOIL BEARINGS GAS PRODUCERS
WIRE MILLS EJECTORS REGENERATIVE FURNACE CONTROL

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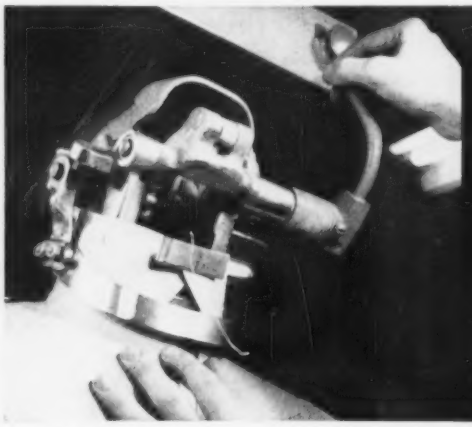
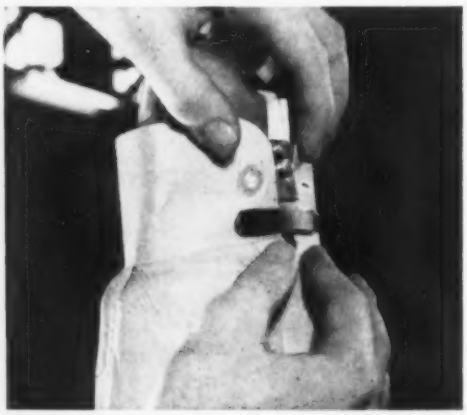


Special
ARMCO STAINLESS STEEL
Helps Presses Keep Their Shirts On

CLAMPS COLLAR—Despite repeated flexing action, this curved collar clamp must not take a permanent set. The excellent spring properties offered by Armco 17-7 PH are essential.

TETHERS TAIL—This Y-shaped shirt-tail clamp of Armco 17-7 PH Stainless replaced a more costly, two-piece plated clamp. Strength and springiness help it do its job. Workability, ease of heat treatment, and the simple design possible with Armco 17-7 PH, make it economical.



GRIPS CUFF—Firm grip is required of this cuff clamp. It must not mark cuffs, yet must hold steady. Made from Armco 17-7 PH Stainless, it is tough—won't break even after long service.

"They don't lose their grip"

That's what designers at The American Laundry Machinery Company, Cincinnati, Ohio, say about three husky clamps made of Armco 17-7 PH Stainless Steel on their "Formatic" shirt presses.

Despite repeated bending action, the clamps don't take a permanent set. They maintain their "spring" because of the exceptionally high strength and elastic properties of this special Armco Stainless Steel. They resist corrosion, too . . . help keep shirts spotless.

Moreover, this special stainless steel holds down production costs as well as it holds down shirts. It is easily fabricated in the annealed condition; then, "spring temper" is readily achieved by heat treatment with a minimum of distortion.

Freedom from rust, easy cleaning, and durability are indispensable in laundry machines. For these reasons, The American Laundry Machinery Company also uses other stainless steel types wherever possible throughout a complete line of commercial laundry equipment.

Need Corrosion-Resisting Springs?

Investigate Armco 17-7 PH. It is produced in sheet, strip, plate, billets, bar, and wire. A companion grade, Armco 17-4 PH, is supplied in billets, bar, and wire. For more information about these Armco Precipitation-Hardening Stainless Steels, call your nearest Armco Sales Office or write to the address below.

ARMCO
Steel Corporation

1247 CURTIS STREET, MIDDLETOWN, OHIO
SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

Your Savings Bond Is a Badge of Freedom!

We take much for granted in this country of ours. Our government's promises are expected to be kept. When we invest life savings in government bonds we know we are going to get back principal and interest.

But Russia has no such integrity. Her people don't know from one year to the next what will happen to their savings. The Soviet government has just given its people the greatest double cross in recent years.

Russia has repudiated its internal bonded debt. Her people had been told they would get their money back with interest. The very reverse is now true. The Red government exhorted its citizens to buy the bonds. Farmers were forced to buy them.

Adding to a long line of oppressive measures, the money "raised" often went to put down uprisings in satellite nations. Soviet citizens have been called upon to sacrifice their money for their government. This is the cruelest kind of mockery and deceit.

Russian bondholders have been told time and again that their money was safe. They have been assured that the interest would be forthcoming. Millions of collective farmers had counted on this to take care of them in their ripe old age.

Now there will be no interest at all on most bonds. Nor can anyone get back his money now. A 20-year or more ban has been put upon paying back any part of the debt. This spells financial trouble within the Russian nation which has been tossing money to Eastern European nations as a prop for Communism. At the same time, it has been breaking its people's back with a war machine that rivals any in history.

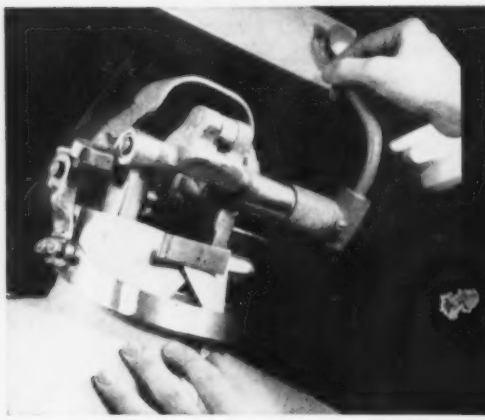
As an American citizen, what is your outlook as an investor in your government? You are able to put away savings bonds knowing you will get what you invested. You know your interest is safe: that it is going to be raised on "E" bonds to 3¼ per cent.

You know these savings bonds are really Freedom Bonds. They pay for the protection measure that Russia has forced us to take. They represent savings you might not have made otherwise. You take no risk that you will lose all or even part of the principal.

But most of all: your Government Savings Bond is a badge of a free nation that keeps its word to its people. That is worth investing in—if you care to remain free.

Tom Campbell

Editor-in-Chief



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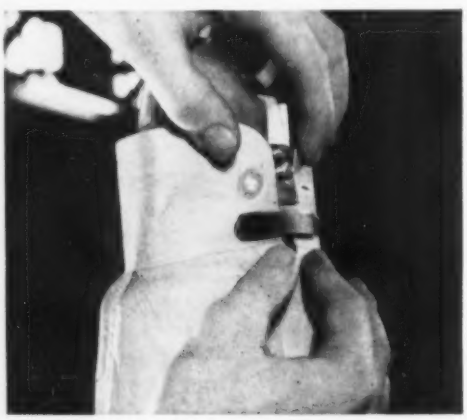

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Tom Campbell

Editor-in-Chief

Count on *Continental* to

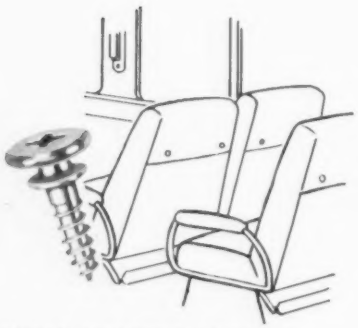
meet special fastening problems

with specialized cost-saving experience

Continental Assembly Engineers' Specialized approach to fastener trouble-shooting assignments gets you the right answer promptly, with the biggest cost savings — for two reasons.

First, since Continental can supply more types of standard fasteners, from stock, their recommendations are unbiased. They can tell you if some "standard" you've overlooked will meet your needs.

Second, if a "special" is the best answer, you can rely on Continental's unlimited experience to design and produce a fastener that will meet all specifications at the lowest possible cost.

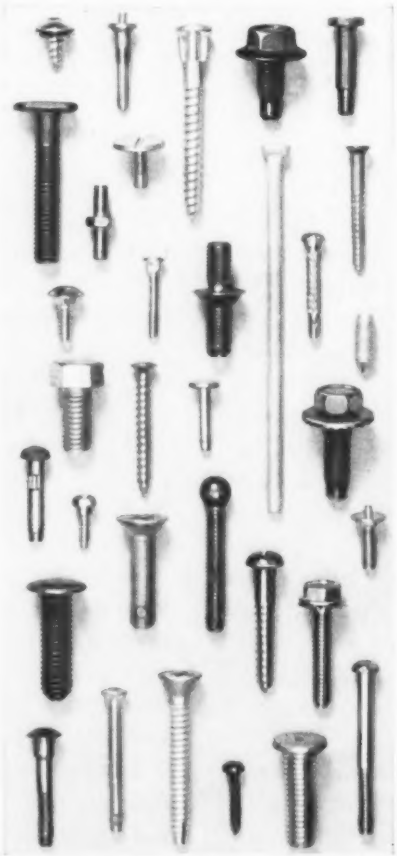


SPECIAL HOLTITE® PHILLIPS
button-head screw replaces two-piece fastening . . .

A bus builder asked Continental Assembly Specialists how to simplify installation of towel-holding buttons on back of bus seats. Separate wood screw and metal button being used caused slow work, with many pieces dropped and wasted.

One-piece button head special screw designed by Continental reduced parts cost 10%. Easy installation of simplified fastener provides much bigger saving in assembly costs.

COST LESS
SPEED ASSEMBLY



HOLTITE® NYLOK®
self-locking screws solve problem of screws loosening in chain saw

When consulted by a chain saw maker on the problem of screws vibrating out, Continental Assembly Specialists had the answer in HOLTITE® NYLOK. Two of the several types of machine screws furnished, all fitted with the resilient nylon plug, are illustrated. These NYLOK screws do not loosen in spite of extreme vibration, keep the saws "on-the-job". Previous customer complaints of high maintenance costs were eliminated.

END COMPLAINTS OF
HIGH MAINTENANCE COSTS

"Special" attention like this will pay off for you . . .

It costs you nothing to talk to a Continental Assembly Specialist. And, as soon as he digs into your problem, you'll see what we mean by "specialized experience". For prompt service, write or phone: Continental Screw Co., 450 Mt. Pleasant St., New Bedford, Mass.

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HOLTITE FASTENERS

HOLTITE PHILLIPS AND SLOTTED HEAD
WOOD • MACHINE • TAPPING • THREAD CUTTING • SEMS • NYLOK
HY-PRO PHILLIPS INSERT BITS AND HOLDERS

LETTERS FROM READERS

Government Business

Sir—I was very much impressed with the way my article ("How to Do Business in Washington," Apr. 4) came out. I think your editors did an excellent job.

My major hope is that the article bears some fruit, because some of the industrial representation arrangements in Washington fall very wide of the mark.—H. Struve Hensel, Washington, D. C.

Safety Conscious

Sir—I have noticed that many of the workers pictured in THE IRON AGE, even some of the factory workers, are more "ham" conscious than safety conscious. They are pictured in plants without safety glasses.

Perhaps they have seen everything in this lousy old world and do not need their eyes. Just clip some of them in the eyes, put bandages on, and tell them that their sight is gone. That would make them safety conscious in one mighty big hurry.

I must wear glasses in order to see, so if I did not have to, I might be as careless as they. Here at Ryan it is compulsory to wear glasses when in the factory, and that means everyone, including T. C. Ryan.

Since many people read your wonderful magazine, you could set the Safety Program back considerable by showing un-safety-minded pictures.—J. J. Patterson, Firestone T & R Co., Rep. at Ryan Aero Co., San Diego, Calif.

▪ You certainly are correct about the number of people who apparently "forget" their safety glasses. Perhaps we can start a little campaign on this in our "Letters" column.—Ed.

Choosing Electrodes

Sir—Just finished reading your article in the Apr. 4 issue, "Rating System Simplifies Welding Electrode Selection" by O. T. Barnett. It is without doubt the most up-to-date information on the methods of selection of welding electrodes I have seen.—D. Baclini, Production Mgr., North American Iron & Steel Co., Inc., Brooklyn, N. Y.

Organic Finishing

Sir—We wish to congratulate you for an excellent article on organic finishing in your Mar. 21 issue. If possible, we should like to receive three additional copies of this article.—W. H. Gushard, Virginia Barrel Co., Staten Island, N. Y.

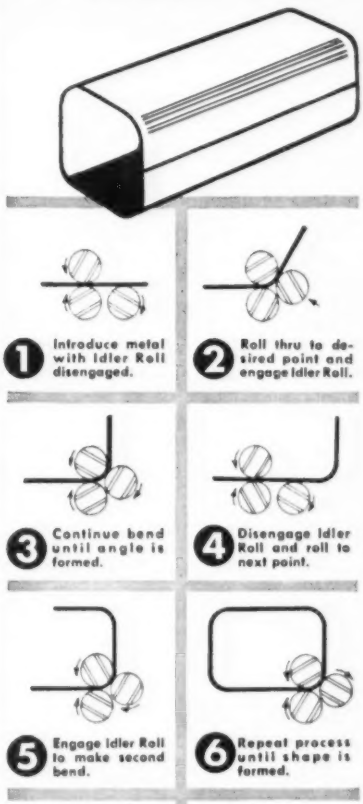
Sir—I read with a great deal of interest your article, "How To Get More For Your Organic Finishing Dollar." This is one of the finest articles concerning this subject I have ever read in my 17 years in the paint industry—K. G. Keely, Industrial Sales Rep., The Glidden Co.

Price of Survival

Sir—Your editorial, "The Price of Survival Comes High!" is sincerely commended because common sense is woven throughout it. —G. A. Ptitsin, West Los Angeles, Calif.

"You inexperienced men can waste more time! Just drop the crate on edge and it'll pop right open."

HOW TO FORM
a rectangular shape


1 Introduce metal with Idler Roll disengaged.
2 Roll thru to desired point and engage Idler Roll.
3 Continue bend until angle is formed.
4 Disengage Idler Roll and roll to next point.
5 Engage Idler Roll to make second bend.
6 Repeat process until shape is formed.

with the
DI-ACRO
ROLLER

Forming small and large circles without flat spots and a variety of other sheet metal shapes is easily accomplished on the Di-Acro Roller with its *exclusive cam actuated Idler Roll.* Consult the yellow pages of your phone book for the name of your nearest Di-Acro distributor or write for six page instruction folder.

pronounced die-ack-ro
di-acro PRECISION METALWORKING MACHINES
O'NEIL-IRWIN MFG. CO.
302 Eighth Ave. • Lake City, Minn.

ACID
GOODYEAR INDUSTRIAL PRODUCTS
G.T.M.-Specified
HYSUNITE Acid Hose
C
B
A
A Seamless tube of special synthetic rubber compound resists high concentrations of sulfuric, nitric and chromic acids at temperatures up to 100° F.
B Multiple plies of fabric reinforcement provide strength with maximum of flexibility
C Tough rubber cover resists abrasion and weather

G.T.M. increases acid hose life by 900%

ACID—66° Baume Sulfuric—was the problem at this eastern steel mill. Many types of hose were tried for its transfer from truck to storage tank. But the best hose delivered *only 2,500,000 lbs.* of acid, before embrittling and breaking.

Then the G.T.M.—Goodyear Technical Man—recommended his new HYSUNITE Hose, specifically developed to handle highly oxidizing acids in high concentrations at temperatures up to 100° F. This rugged hose handled a fabulous *26,500,000 lbs.* of acid—was good for many more pounds — when it was removed from service for thorough checking.

If you have hose problems, it will pay you to consult your Goodyear Distributor and/or the G.T.M. Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

HYSUNITE HOSE by

Hysunite—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

GOODYEAR

THE GREATEST NAME IN RUBBER

IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*

Flying Foundryman

A good many readers looking at our covers probably figure, "Gee, that's a striking (or unusual) (or interesting) (or weird) picture," then go thumbing through the book to find out what it's all about. But for the editors, it can really get rather hectic.

This week's cover, for example, shows a foundry salesman about to take off for a customer's plant. It looks simple enough. Yet it represents the combined work of over half a dozen men, several hours flying time and untold 'phone calls. In all honesty there was no blood shed and what would have been sweat simply froze because it was so cold.

Heads Up Selling—The idea of foundries using airplanes for sales contact came to our Cleveland Editor, Tom Rohan, when he was assigned this week's special report

Shellabarger on the wing.

(P. 58) on how foundries are revving up their marketing efforts.

One company, Dalton Foundries, Warsaw, Ind., was so anxious to show off its progressive merchandising that it offered to fly to Cleveland, pick up Tom and take him out to Indiana. So was another, Superior Steel & Malleable Castings Co. at Benton Harbor, Mich., 100 miles away.

On the day of the big airlift, both Dalton and Superior "Airlines" were grounded. So Tom took off by car. After a harrowing journey including a collision on the turnpike (other guy's fault) he made it to Warsaw.

Weather Troubles — Superior "Airlines" meanwhile was trying to get into Warsaw and hedgehopping 300 ft off the ground trying to land its Beechcraft Bonanza next to Dalton's Cessna 310 for the big picture. But in vain. The clouds had no holes.

An attempt then was made to take a picture at Warsaw despite severe cold and snow. The cut below shows Ol' Joe Shellabarger, Dalton's sales manager, climbing on the Cessna's wing with a casting. If there's a smile on his face it's only his natural good spirits shining through a bitter wind whistling across the airport. But the photo couldn't do for a late April cover.

Four foggy days later Dalton "Airlines" made it into Benton Harbor and the great photo rendezvous was at hand. It was now or never; although now was 6 P.M. and getting darker.

The greatest blow was yet to come.

Camera Jams — The local photog's film changing mechanism jammed after six pictures and all seemed lost. The high-priced executives retired to the hanger and waited for another photographer before starting to wrestle the planes around again. In due time, photographer No. 2 arrived and the photos were taken.

Because the deadline was at hand, the pix were developed and printed while the Dalton and Superior foundrymen had dinner. Then Shellabarger and Dalton "Airlines" flew to South Bend and mailed the photos. They arrived just in time in Philadelphia.

You'll read more on new foundry interest in marketing in the complete Special Report.

Sure . . . it can be DROP-FORGED

WILLIAMS turns out jobs others turn away!

• It is not unusual for Williams to come up with the solution to difficult drop-forging problems which other plants are not equipped to handle.

Williams has broad and specialized experience plus complete facilities and equipment. Your forgings can also be milled, drilled, turned or broached. There are complete die sinking facilities . . . and the latest inspection techniques, including Magnaflux.

Call in a Williams engineer for forgings of carbon, alloy and stainless steel, aluminum, brass, bronze, titanium or monel.

J. H. WILLIAMS & CO. BUFFALO N.Y. 1857 75th Anniversary 1957 WILLIAMS TOOLS OF INDUSTRY

NEW BROCHURE GIVES YOU THE COMPLETE PICTURE

J. H. WILLIAMS & CO.
431 Vulcan Street Buffalo 7, N. Y.

Send me a FREE Brochure

Name .....

Company .....

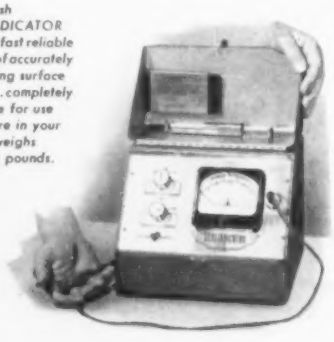
Address .....

Can you afford to gamble on surface finish?

Today's more exacting quality standards have added a new dimension to every machined part. This dimension is *surface roughness* and it is now recognized as an important factor in machining costs. Yet, because of inaccurate measurement of this important new dimension, parts are often over finished and costs soar . . . or parts are under finished and product trouble develops.

Surface finish can be measured accurately

Unnecessary finishing expense can be prevented. A remarkable measuring instrument has been developed that permits *anyone* to make accurate surface finish measurements. Called the Brush SURFINDICATOR*, it permits checking of every finished or in-process surface in accordance with industrial and military specifications. The SURFINDICATOR can be operated without special training—a hand-held stylus is simply stroked over the surface to be measured and a direct reading taken in micro-inches. Completely portable, the SURFINDICATOR is designed for use where it's needed most—at the machine. Extremely accurate, it is the lowest cost method of finish control.



The Brush SURFINDICATOR offers a fast reliable means of accurately measuring surface finish . . . completely portable for use anywhere in your plant, weighs only 15 pounds.

Precision Reference Specimens are provided with every instrument as a quick calibration check to permit field adjustment for absolute accuracy.

Full information on the cost-saving Brush SURFINDICATOR and ASA Standards contained in descriptive booklet . . . new Brush Surface Finish Control Efficiency Study can help evaluate surface finishing.

The complete story on how surface finishing costs can be controlled is contained in our booklet describing the Brush SURFINDICATOR. To help you in evaluating over and under finishing in your plant, a Surface Finish Control Study form is also available. Write for both—they can provide you with a new insight to the cost savings possible through accurate surface finish control.

*T. M.

BRUSH ELECTRONICS COMPANY
3500 Perkins Avenue, Cleveland 14, Ohio

BRUSH ELECTRONICS

DIVISION OF CLEVITE CORPORATION

EXHIBITS, MEETINGS

Engineered Castings Show — May 6-10, Cincinnati. (American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.)

Design Engineering Show — May 20-23, New York. (Clapp & Poliak, 341 Madison Ave., N. Y. 17).

Packaging & Handling Show—Oct. 28-31, Atlantic City. (SIPMHE, One Gateway Center, Pittsburgh 22).

Metal Show — Nov. 2-8, Chicago. (American Society for Metals, 7301 Euclid Ave., Cleveland 3).

APRIL

Scientific Apparatus Makers Assn. —Annual meeting, Apr. 27-May 2, Greenbrier, White Sulphur Springs, W. Va. Society headquarters, 20 N. Wacker Dr., Chicago.

Assn. of Iron & Steel Engineers—Spring conference, Apr. 29-May 1, Netherland Plaza Hotel, Cincinnati. Society headquarters, 1010 Empire Bldg., Pittsburgh.

Metal Powder Assn. — Annual meeting, Apr. 30-May 1, Drake Hotel, Chicago, Society headquarters, 130 W. 42nd St., New York.

Investment Casting Institute—Annual spring meeting, Apr. 30-May 2, Sheraton Park Hotel, Washington, D. C. Society headquarters, 27 E. Monroe St., Chicago.

May

Society for Experimental Stress Analysis — Spring meeting and exhibit, May 1-3, Hotel Statler, Boston. Society headquarters, P. O. Box 168, Cambridge 39, Mass.

American Institute of Electrical Engineers—Northeastern district meeting on computers and controls

Continued on P. 16

WHOOSH!
NO MORE FIRE
Point horn, pull trigger, fire's out! That's all it takes to knock out deadly fire with instant-action Kidde dry chemical portable extinguishers! So easy to use, even inexperienced operators get perfect fire-fighting results. Kidde's patented diffuser horn spreads dry chemical powder over wider area for greater fire-killing power. Trigger-release means faster action, feels more natural in the hand. Pick the Kidde dry chemical portable to fit your needs: 5, 10 lb. pressurized (recharged at any commercial air pump), 20, 30 lb. cartridge operated. For more information on dry chemical, carbon dioxide and wet chemical extinguishers, write today for Kidde's P-8 catalog and name of nearest distributor.
Kidde
Walter Kidde & Company, Inc.
449 Main St., Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd.
Montreal — Toronto

3/4"- 4.320" threading range

...with one LANDMACO Machine

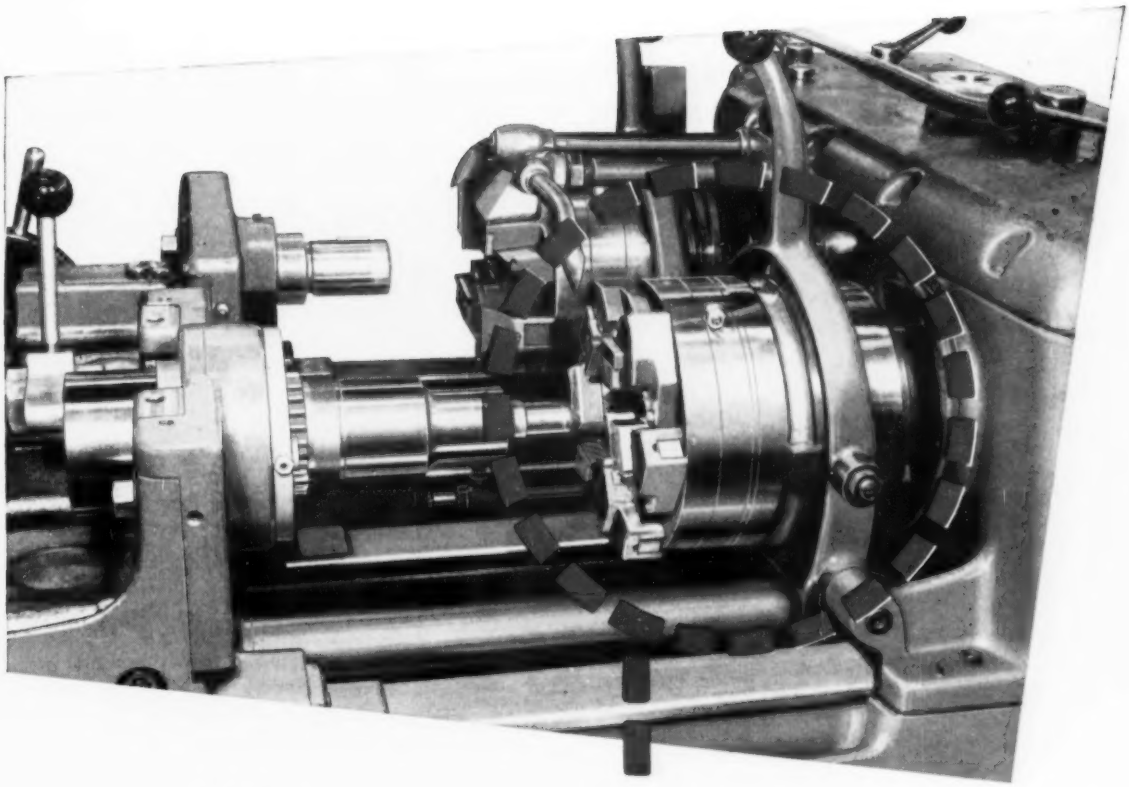
The Twin Disc Clutch Company Hydraulic Division in Rockford, Illinois, is able to thread a wide variety of work from 3/4"-32 pitch to 4.320"-12 pitch with just one LANDMACO Threading Machine.

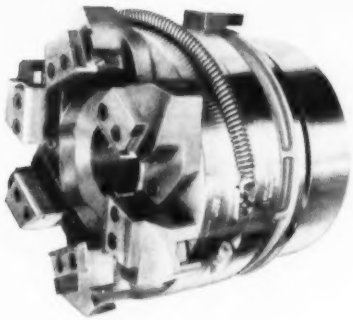
A six-chaser 40RX LANCO Head with a range of 2½" to 9¼" (5-1/8" bore) is mounted on the right-hand spindle to produce fine-pitch large-diameter threads. A 2½"R LANCO Head with a range of ½" to 2½" is used on the other spindle to produce coarse-pitch threads, small-diameter threads, and long thread lengths.

One of the many different operations performed by this equipment is illustrated—threading clutch output shafts with the 40RX Head. The workpiece is made from C1045 steel, heat-treated to 229-269 Brinnell hardness. A special 12-pitch UN Thread, with a 3.669"-3.676" pitch-diameter tolerance, is cut .830" long to within ¼" of the shoulder. 15 pieces are threaded per hour, including 100% inspection by gauging on the machine. Even with heat-treated material and exacting thread finish requirements, 100 pieces are completed between chaser grinds.

The different types of special workholding fixtures designed for these short-run operations at Twin Disc are a major factor in the versatility of the equipment used. For example, in the operation illustrated, a special carriage front allows this LANDMACO Machine to thread a workpiece with a diameter well beyond its normal range. These special fixtures may be used interchangeably with the standard vises.

This installation shows how LANDIS Equipment and Engineering can combine to economically solve a problem in Thread Production. May we suggest the most efficient method for producing your Threads?





For additional information:

* on the many types and styles of LANDIS Die Heads, ask for Bulletins F-80 or F-90
* on LANDMACO THREADING Machines, ask for Bulletin H-76.

THE WORLD'S LARGEST MANUFACTURER OF THREADING EQUIPMENT - CUTTING - TAPPING - GRINDING - ROLLING

LANDIS *Machine* COMPANY

WAYNESBORO • PENNSYLVANIA • U. S. A.

455G

MEETS THE
SuperAlloy
CHALLENGE

SIX MODELS AVAILABLE

MODEL VF-5

A new machine for heavy duty milling of conventional alloys including the stainless types . . . and most of the new super alloys.

Engineered by Koellmann and distributed by:

Albert
KLINGELHOFER
MACHINE TOOL CORP.
KENILWORTH NEW JERSEY

EXHIBITS, MEETINGS

Continued from P. 13

in engineering, May 1-3, Wendell-Sherwood Hotel, Pittsfield, Mass. Society headquarters, 33 West 39th St., New York.

National Machine Tool Builders' Assn. — Spring meeting, May 1-3, Sheraton Park Hotel, Washington. Society headquarters, 2071 E. 102nd St., Cleveland.

Air-Conditioning and Refrigeration Institute — Annual meeting, May 6-8, The Homestead, Hot Springs, Va. Society headquarters, 1346 Connecticut Ave., N.W., Washington, D. C.

National Assn. of Architectural Metal Manufacturers — Nineteenth annual convention, May 7-12, Fairmont Hotel, San Francisco. Society headquarters, 228 N. La Salle St., Chicago.

The Porcelain Enamel Institute— Mid-Year division conference, May 9-10, Edgewater Beach Hotel, Chicago. Society headquarters, Associations Bldg., 1145 19th St., N.W., Washington, D. C.

Copper & Brass Research Assn.— Annual meeting, May 12-15, The Homestead, Hot Springs, Va. Society headquarters, 420 Lexington Ave., New York.

The Electrochemical Society—Annual meeting, May 12-16, Statler Hotel, Washington, D. C. Society headquarters, 216 W. 102nd St., New York.

Industrial Heating Equipment Assn. —Spring meeting, May 19-22, The Homestead, Hot Springs, Va. Society headquarters, 1145 19th St., N.W., Washington, D. C.

American Society For Quality Control—Eleventh annual convention, May 22-24, Sheraton-Cadillac Hotel, Detroit. Information: Wade R. Weaver, Registrar, Republic Steel Corp., Cleveland 1, O.

bright future

Buildings constructed and decorated with Stainless Steel are cleaner, more attractive places to work and live. When you're planning a building . . . design it, improve it and protect it with McLOUTH STAINLESS STEEL.

specify

McLOUTH STAINLESS STEEL

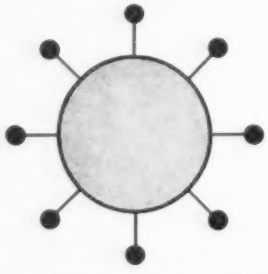
HIGH QUALITY SHEET AND STRIP

for architecture

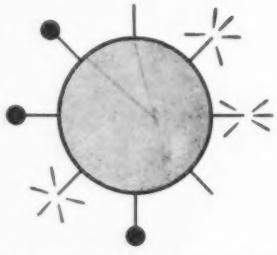
McLOUTH STEEL CORPORATION DETROIT, MICHIGAN

MANUFACTURERS OF STAINLESS AND CARBON STEELS

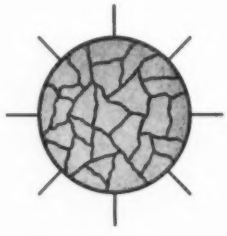
Does the solvent you use "go sour," like this?



1. The trichlorethylene you use for degreasing metal is protected by a stabilizer (small circles) against heat, light, air, moisture, acids and active metals like aluminum.

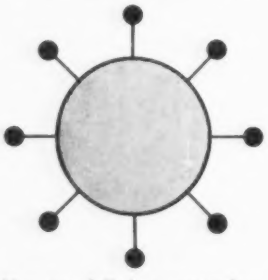


2. Ordinary stabilizers wear out or become depleted during normal use. With some solvents, you have to titrate your bath frequently, and may have to add fresh stabilizer.

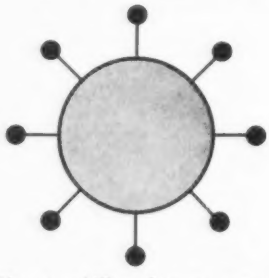


3. When stabilizer wears out, your degreaser doesn't function properly. It may even stain metal parts instead of cleaning them. You have to clean out the "sour" bath.

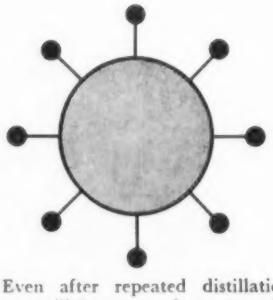
Use Nialk® TRICHLORethylene and get psp ... like this



1. You get full-time protection with NIALK stabilizer's unique action. Notice the difference between the next two diagrams and those above.



2. NIALK stabilizer does not wear out during normal use. It's always there, working. You never have to titrate your bath, or add fresh stabilizer.



3. Even after repeated distillations, you still have complete protection. All the stabilizer is active. Only NIALK has this **psp**—permanent STAYING power.

Why you pay less to degrease with Nialk® TRICHLORethylene

The drawings above demonstrate a difference—a big, cost-cutting difference—between NIALK TRICHLORethylene and conventional vapor-degreasing solvents.

NIALK has **psp**—permanent STAYING power—in its stabilizer. It's neutral, non-alkaline. You never have to replenish it.

psp means cheaper degreasing

You don't have to clean out your degreaser nearly so often with NIALK TRICHLORethylene. You can degrease many more parts between cleanouts.

The NIALK stabilizer actively retards formation of degradation products in your degreaser—cleanouts are easier, faster.

Get proof of Nialk's cheaper, safer degreasing

See for yourself how NIALK with **psp** remains stable, keeps cleaning efficiently long after other solvents have lost their punch. Write on your business letterhead for a resumé of comparative metallurgical tests on five leading brands.

HOOKER ELECTROCHEMICAL COMPANY
304 UNION STREET, NIAGARA FALLS, N. Y.

NIAGARA FALLS • TACOMA • MONTAGUE, MICH. • NEW YORK • CHICAGO • LOS ANGELES

Manufacturers of VIRGO® DESCALING SALT, VIRGO ELECTROLYTIC SALT, VIRGO MOLTEN CLEANER

HOOKER CHEMICALS PLASTICS

663W38

Getting your share of today's $400 billion market?

These dynamic and expanding times call for sales methods that measure up to the modern buying market. A tremendous amount of money is spent by industry for needed goods and services—*over $135 million each business day.*

There are many ways in which a company can assure itself of a fair share of our fast-moving industrial market: through sales expansion . . . marketing realignment . . . new products . . . and advertising. One of the most economical ways is with *a well-balanced advertising program!*

Industrial advertising goes to work at once, reaching and selling more of the people you want—now! It adds effective sales push in all the scattered corners of the vast buying market—as well as in the areas and offices your salesmen don't have time or opportunity to cover. And industrial advertising requires only a fraction of your total sales investment.

One business success after another has proved *it pays industry to advertise to industry.*

NATIONAL INDUSTRIAL ADVERTISERS ASSOCIATION, INC.

271 Madison Avenue, New York 16, N. Y.

An organization of over 4000 members engaged in the advertising and marketing of industrial products, with local chapters in ALBANY, BALTIMORE, BOSTON, BUFFALO, CHICAGO, CLEVELAND, COLUMBUS, DALLAS-FORT WORTH, DENVER, DETROIT, HAMILTON, ONT., HARTFORD, HOUSTON, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, MINNEAPOLIS-ST. PAUL, MONTREAL, QUE., NEWARK, NEW YORK, PHILADELPHIA, PITTSBURGH, PORTLAND, ROCHESTER, ROCKFORD, ST. LOUIS, SAN FRANCISCO, TORONTO, ONT., YOUNGSTOWN.

GENERAL ELECTRIC ANNOUNCES . . .

NEW Industrial

Direct-current Motor

KINAMATIC* a new standard in direct-current motors, gives your machines wider speed ranges, greater output

To meet modern industrial needs for faster, more automatic, more continuous production, General Electric has designed an entirely new direct-current motor—the d-c Kinamatic.

Designed for Automation—Now, a direct-current motor has been designed for the modern job it has to do—either as individual motor drive or in regulating systems. The new General Electric d-c Kinamatic motor supplies the wide speed range and versatility required for today's manufacturing methods. It is designed for the close control of machines and split-second timing of processes essential to higher output.

Accelerated Production—The new d-c Kinamatic motor will modernize your equipment, give it increased power, higher speeds, greater output capacity. With the quick-acting G-E Kinamatic motor, your machines will process a greater variety of products . . . faster . . . easier . . . and with less maintenance and spoilage.

More Powerful—By combining advanced design with improved materials and manufacturing techniques, General Electric engineers have packed more power into the entire Kinamatic line. The powerful Kinamatic motor, with new stamina and durability, is ready to become one of your most effective weapons for keeping costs down, for meeting competition, for boosting productivity levels.

Engineering Help—Industrial specialists in 149 conveniently located General Electric Apparatus Sales Offices have the complete story on how the new d-c Kinamatic motors and generators can benefit your operation. For full details, contact your G-E Sales Representative, or write for Bulletin GEA-6355. *Direct Current Motor and Generator Department, General Electric Company, Erie, Pennsylvania.* 813-1

* Trade Mark of the General Electric Company

Progress Is Our Most Important Product

GENERAL ELECTRIC

"Got A Load On Your Mind? I Haven't"

Nothing gives employees a more luxurious, satisfied feeling than that of financial security. And nothing is easier for them to achieve when you provide the convenience of automatic Payroll Savings Plan.

EVERYBODY BENEFITS

Security breeds confidence—and confidence stimulates job interest and results in steadier people who are far more efficient in their work. Receiving those crisp Bonds at regular intervals along with their paycheck is an added inducement for employees to stay on the job.

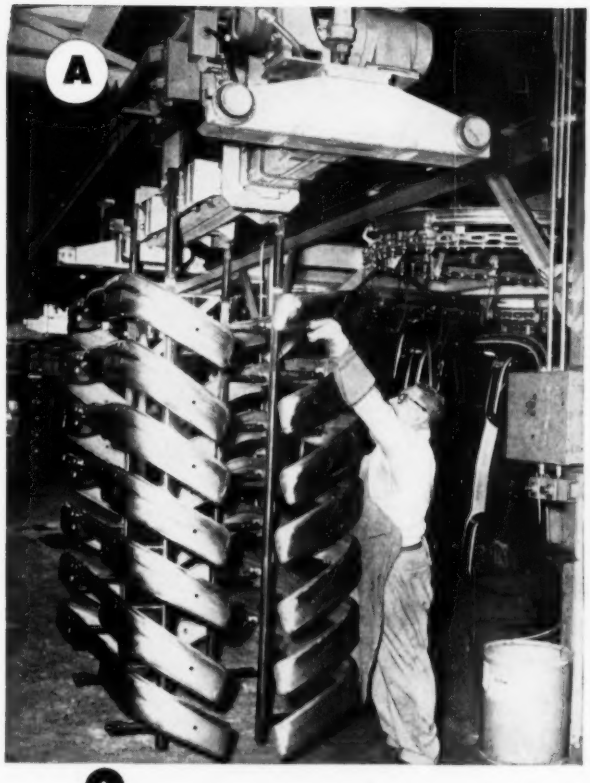
Moreover, when you install the Payroll Savings Plan in your company, you promote not only the security of your personnel but the security of your company and your country. Over forty million Americans have over 40 billion dollars invested in United States Savings Bonds—a backlog of purchasing power for the future.

EASY TO INSTALL

If your company does not now have a Payroll Savings Plan, or if employee participation is less than 50%, a letter to: Savings Bonds Division, U. S. Treasury Department, Washington, D. C. will bring prompt assistance from your State Director. He will provide application cards, promotional material, and as much personal help as you need.

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

The **IRON AGE**



AMERICAN MONORAIL

teams with *Udylite*

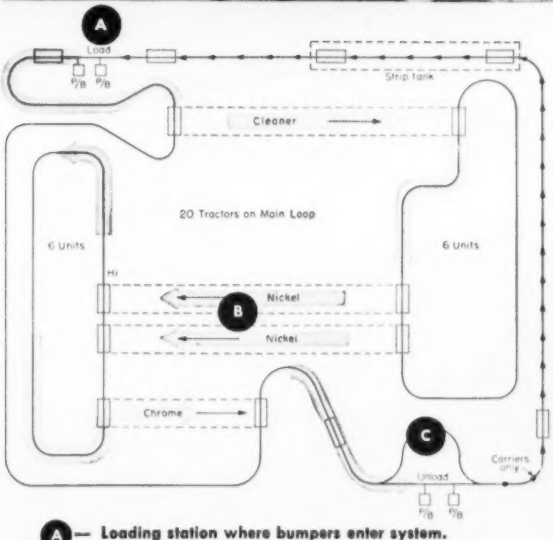
plates auto bumpers at Rheem Automotive plant

Combined engineering skills resulted in substantially reduced handling costs for the plating of auto bumpers at the new Rheem Automotive plant at Fullerton, California.

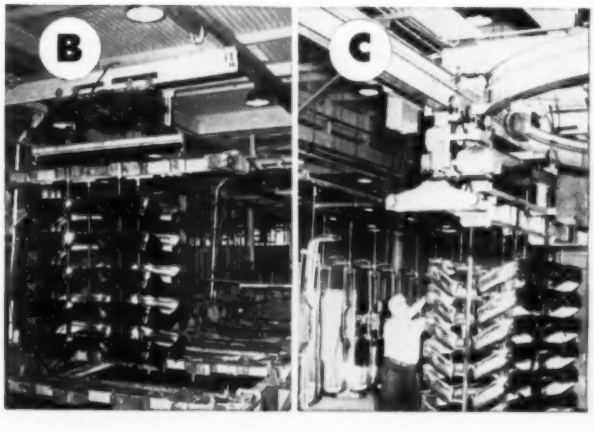
32 American MonoRail automatic dispatch units move special Udylite bumper carriers on three monorail systems with 14 drop sections to maintain continuous automatic plating.

Let American MonoRail engineers combine to solve your handling problems.

Write for Bulletin C-1.



A— Loading station where bumpers enter system.
B— Bumpers move through nickel tanks.
C— Inspection and unloading station.



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For Power Driven Conveyors, Use Landahl Chainless Conveyors

AMERICAN MONORAIL COMPANY

OVERHEAD HANDLING EQUIPMENT

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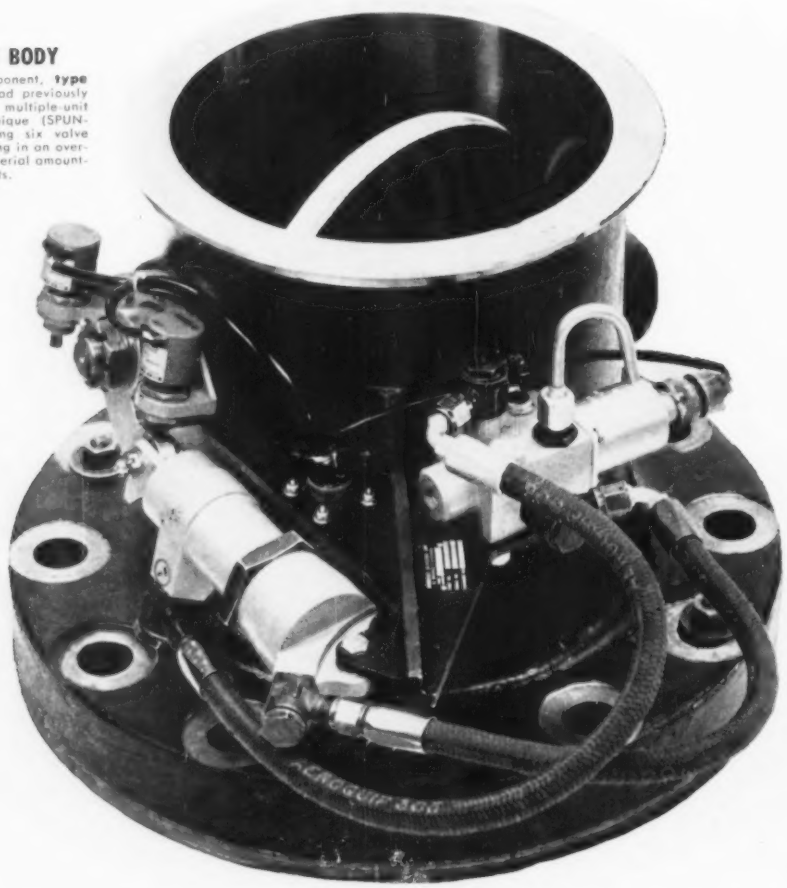
VALVE LINKAGE LEVERS

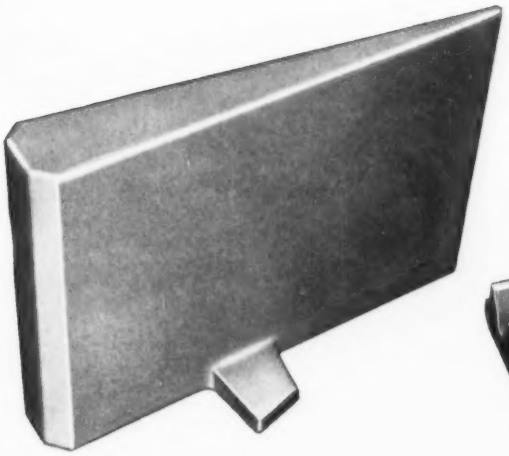
Small parts are no problem. These ESCO SHELLCAST corrosion resistant alloy steel **type 317, A296-49T, CF-8M,** valve linkage levers weigh less than two ounces each.

Before you say, "It can't be cast,"

BUTTERFLY VALVE BODY

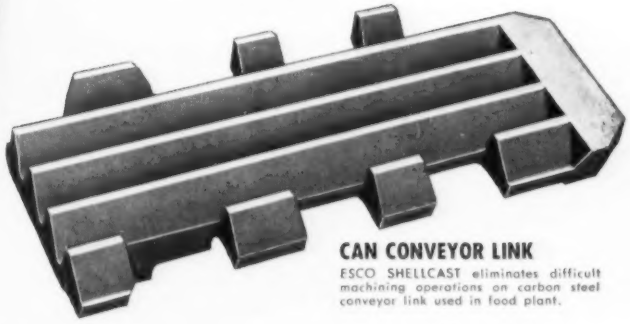
This guided missile component, **type 304, A296-49T CF-8,** had previously been fabricated. ESCO multiple-unit centrifugal casting technique (SPUN-CAST®) was used, casting six valve bodies at one time resulting in an overall saving in time and material amounting to 30% of former costs.





HEAT-TREATING VANE TIP

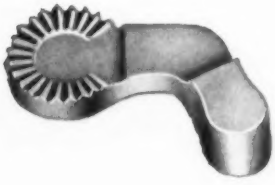
ESCO SHELLCAST in a heat resistant weldable alloy, **type 302B, A297-49T HF,** eliminated all former machining.



CAN CONVEYOR LINK

ESCO SHELLCAST eliminates difficult machining operations on carbon steel conveyor link used in food plant.

call an *ESCO* Engineer...



ESCO alloy steel castings can make your designing *easier*. You get the part you want, in the alloy you need and in the shape that saves you the most fabricating, machining and finishing time . . . ***PLUS***

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ESCO maintains one of the largest and best equipped metallurgical staffs of any alloy steel foundry . . . ***PLUS***

PRODUCT ENGINEERING AND DESIGN

An integrated service at all levels; in the field, at the drawing board and in the foundry . . . ***PLUS***

FOUNDRY FACILITIES AND CASTING EXPERIENCE

A casting service that covers the complete range of alloy steel casting methods for all applications . . . ***PLUS***

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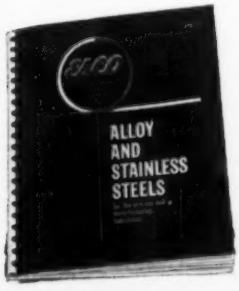

Call an *ESCO* Engineer — let him show you how *ESCO* Alloy Steel Castings can help make your designing easier.

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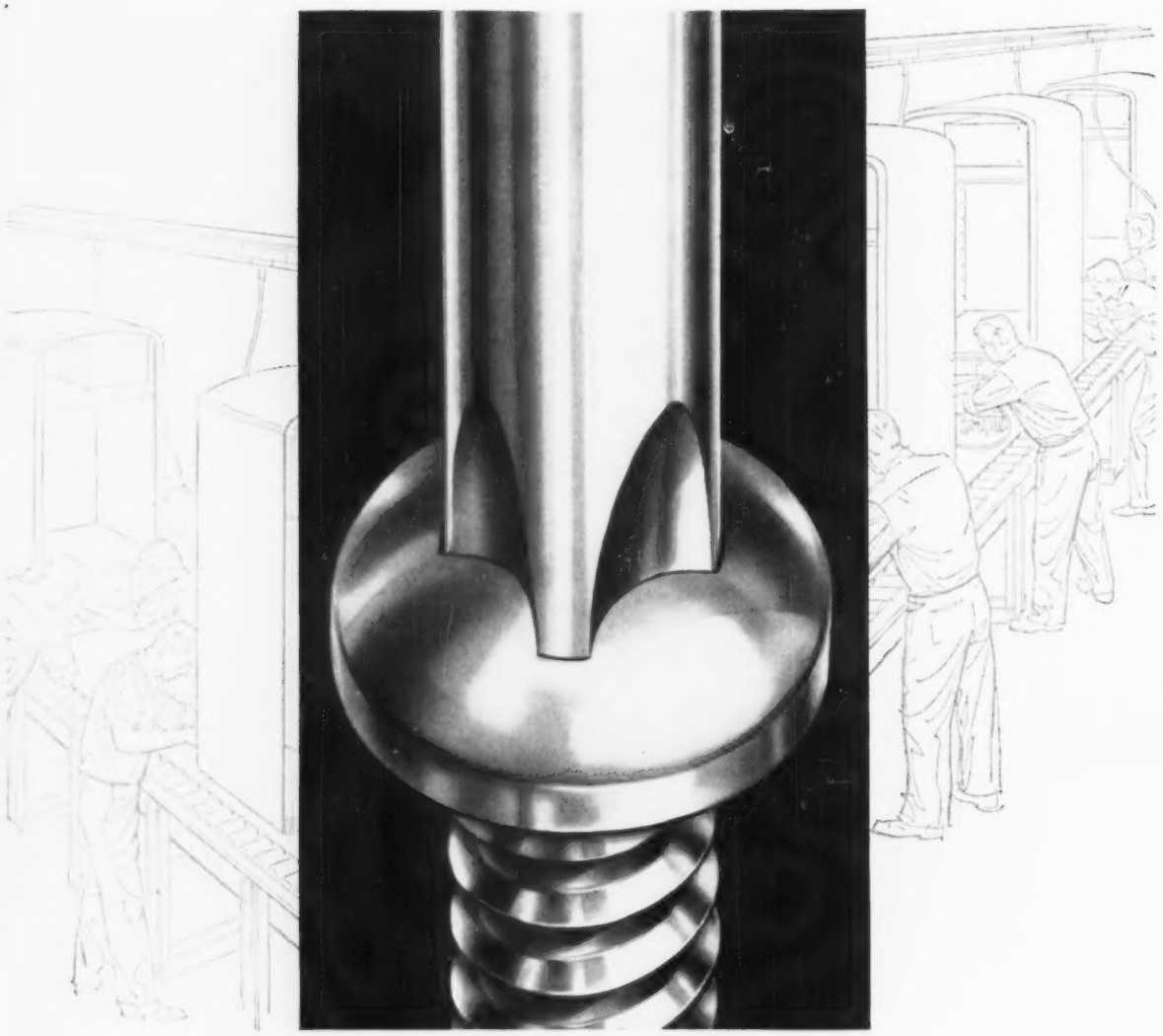
Vancouver, British Columbia; Toronto, Ontario, and Montreal, Quebec.



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Four factors usually determine your actual fastening costs:

1. Price
2. Service
3. Quality
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Occasionally local price differentials may seem worthwhile, but no one gives you more of all four than American.

American Gives You More of All Four

In Service — where regardless of geographical location American is constantly meeting required delivery schedules.

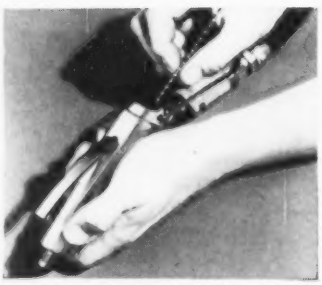
In Quality — that's a product of the machine, confirmed at the inspection table.

In Research — where American Engineers have not only developed the internationally accepted Phillips Head Fastener, but have created such exclusive products as SCREWSTICK for companies with unique fastening problems. SCREWSTICK enables power driving to replace the individual handling of small, tedious-to-manage screws resulting in cost savings exceeding 4 to 1.

You can use these same facilities to increase production, cut costs and boost quality, because no one gives you more of all four factors: *price*, *service*, *quality* and *research* than American.

Find out for yourself. Send us your inquiry for price and delivery or your specifications for special fasteners. Write:

American!



SCREWSTICK being loaded into air-powered driver.

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Round Port 100% Pipe Area

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ALL TYPES OF PORT OPENINGS

Homestead Cam-Seald Tapered Plug Valve Positive Metal to Metal Seal

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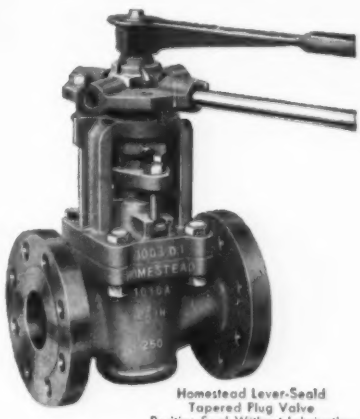
Name the type of valve you need in the metal or alloy you require with the port opening you want—and we can furnish it. Or if you have a valve problem that defies solution, write us, naming the fluid, concentration, temperature, pressure, valve size, function and frequency of operation. We will be happy to recommend the best and most economical valve for your service conditions.

For complete information on Homestead Plug Valves



Homestead Lever-Seald Tapered Plug Valve Positive Seal Without Lubrication

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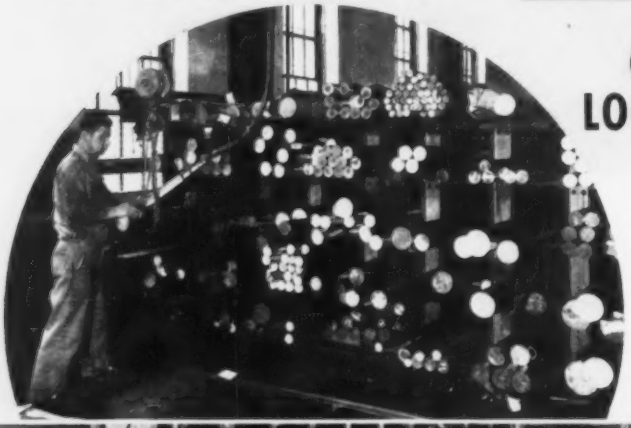

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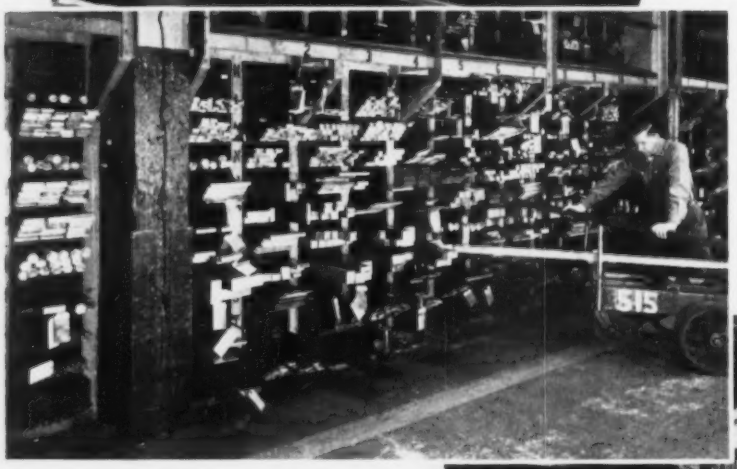
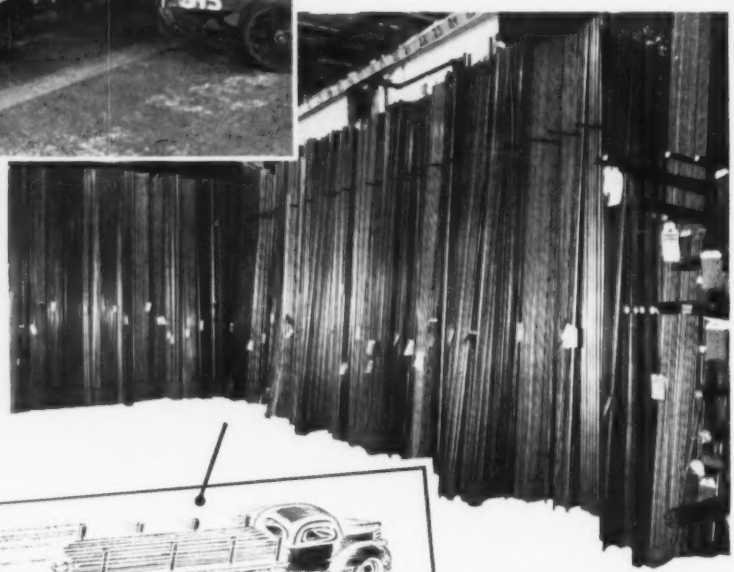
His ample warehouse stocks provide you with a convenient shopping center for all your steel requirements . . . saving you the expense of carrying heavy inventories.

You can buy just what you need:—a few bars or a truckload. Special services are also available to you . . . shearing, flame cutting, sawing to length.





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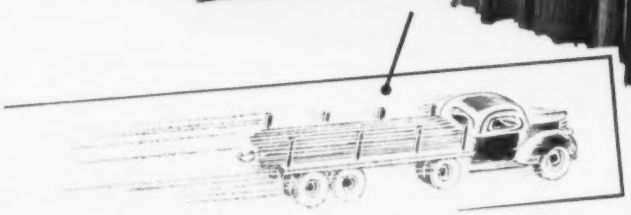
This is today's *finest* Cold Drawn Bar Steel—a quality standard, developed exclusively by Bliss & Laughlin, Inc.



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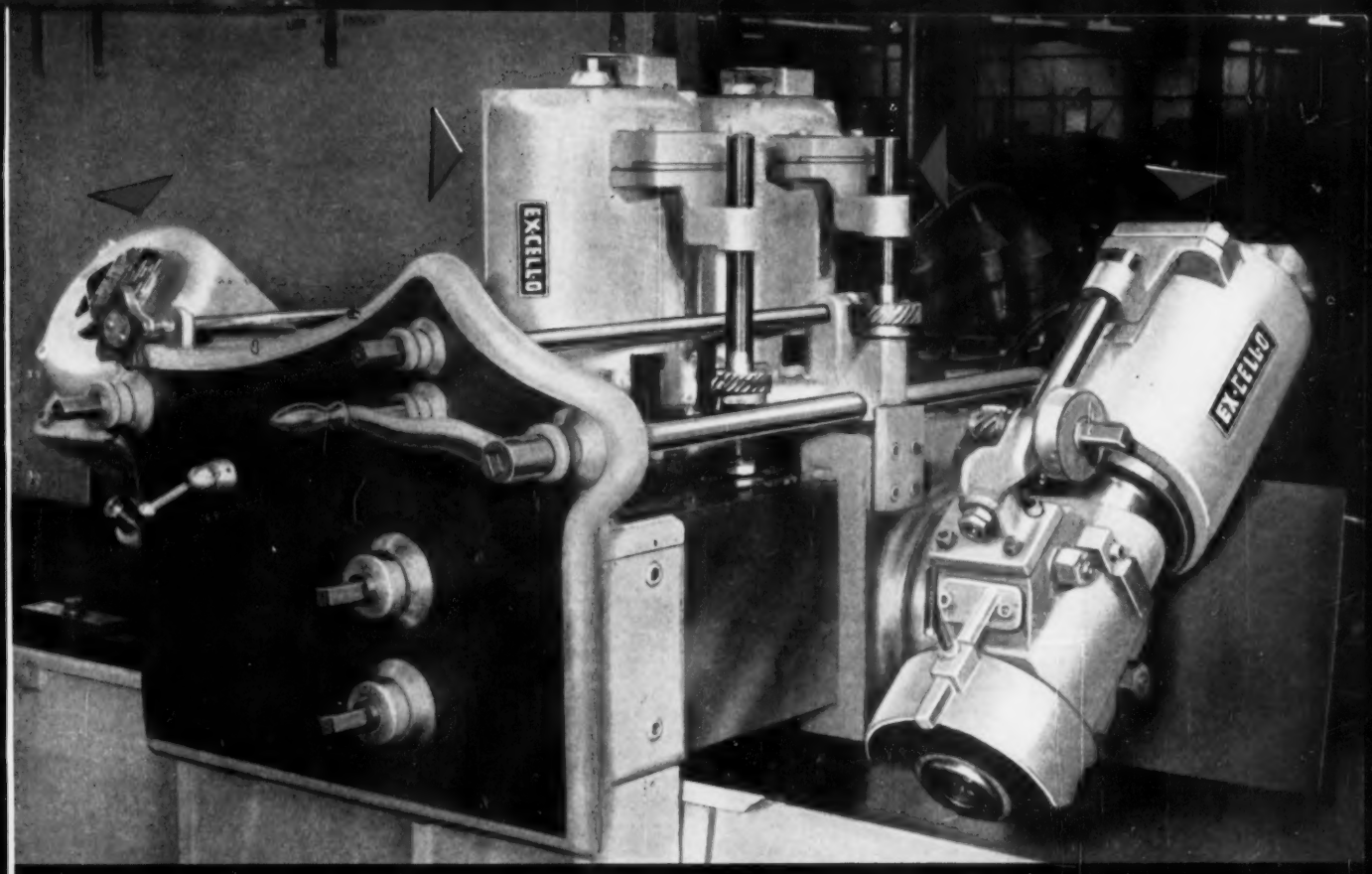

This Idea Multiplied Production by Two...

EX-CELL-O SPINDLES— AN INGENIOUS APPLICATION

A machinery builder in Kalamazoo, Michigan was faced with the problem of finish grinding both flat and angular dovetail ways on the column, knee and table of his vertical milling machines. Surface lengths varied from 9″ to 24″; tolerances on flat and parallel measure had to be within .001″ in 24″. Workpieces were gray iron sand castings.

Conventional way to do the job—an oscillating surface grinder to work each dovetail separately. Production men thought they could improve on convention. They built up their own machine from an old planer bed, added a bridge to support four Ex-Cell-O Precision Spindles and retained the standard planer feed.

The result: grinding both sides of four dovetail surfaces in one-pass planer fashion for a saving of roughly 50 percent in per unit cost. Perhaps you too have an operation which could be performed more economically by an Ex-Cell-O Spindle; or perhaps you simply want to use the most versatile, dependable and long-lived spindle money can buy. In either case, you'll want to get in touch with your nearby Ex-Cell-O Representative, or contact Ex-Cell-O direct.

57-23

Above, four standard Ex-Cell-O Precision Grinding Spindles are utilized to grind four surfaces of machine ways in one pass.

Standard, totally enclosed motorized surface grinder spindle is rated one horsepower at 3600 rpm. Also available in a range of higher horsepower.

XLO EX-CELL-O FOR PRECISION

EX-CELL-O CORPORATION

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Here's what steel Kaiser

COMPARATIVE ENDWALL TRIAL "... had inspected walls day prior to accident and noted Kaiser Periclase Chrome Metal Encased Brick sections were plumb, in line and tight whereas competitive sections were bowed and leaking."

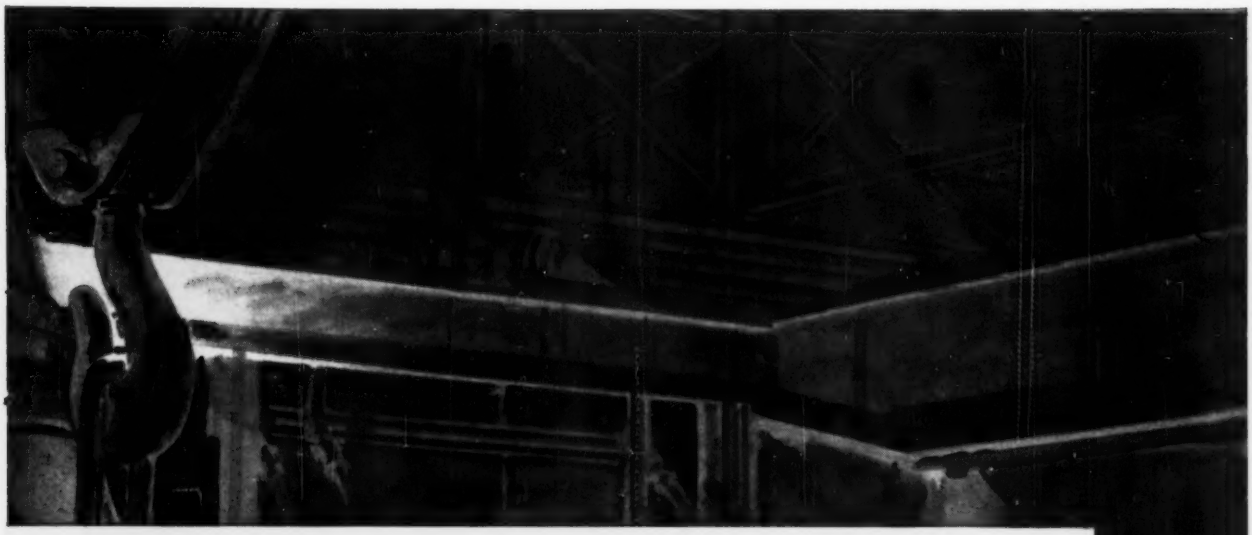
BACKWALLS "... having tremendous success with Kaiser Chrome Periclase Brick in backwalls ... on rebuild, gave instructions to leave it in for another campaign."

HOT TAP HOLES "... averaging between 20 and 25 heats with Permanente 165 on the 300-ton furnaces, where competitive mix previously gave 3 to 5 heats."

ENDWALLS "... Panels of Kaiser Periclase Chrome Metal Encased Brick went 402 heats while competitive panels in the same campaign were replaced at 265 heats."

BOTTOM PERFORMANCE "... Permanente 165 bottom has tapped 413 heats with delay figure of 3 minutes while competitive bottom - rammed five days earlier - has tapped only 360 heats with an average delay figure over bogey of 11 minutes."

ENDWALLS "... Furnace finished its third campaign using Kaiser Periclase Chrome Brick endwall for a total of 562 heats. Other furnaces using competitive brick usually lasted only 200 heats - one campaign."



industry users are saying about Basic Refractories

One of the most significant things about these statements from Kaiser Chemicals customers is that each of them illustrates a *new performance or production record* made possible by changing to a Kaiser Chemicals basic refractory product.

Why this uniform superiority?

Kaiser Chemicals refractories are *especially designed* for peak performance in specific applications in open hearth and electric steel furnaces. Each is a specially-developed composition . . . each is backed by more than 15 years of continuous research and development.

The uniform composition of Kaiser Chemicals refractories—your guarantee of dependability—is assured by Kaiser Chemicals fully-integrated facilities, controlling quality from initial production of sea water magnesia to assistance in final installation at your mill.

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KAISER CHEMICALS BASIC REFRACTORIES FOR THE STEEL INDUSTRY:

Kaiser **PERICLASE** Brick (D-S)
Kaiser **PERICLASE-CHROME** Brick
Kaiser **CHROME-PERICLASE** Brick
Permanente 165 Ramming Mix
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MAGNESITE • PERICLASE • DEADBURNED DOLOMITE • ALUMINAS

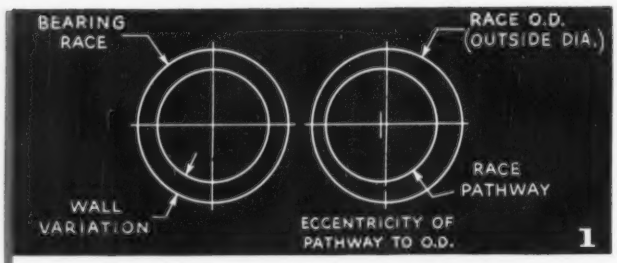
ONE OF A SERIES . . .

What makes a Hyatt roller bearing good?

CLOSE CONTROL OF INTERNAL DIMENSIONS and CLEARANCES

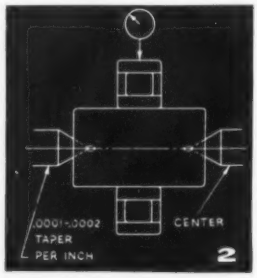
The running accuracy and smoothness of a HYATT roller bearing is governed by the tolerances of its internal dimensions and its internal clearance. Internal dimensions include concentricity of race diameters, uniformity of roller diameters and squareness of all radial and axial surfaces.

Because the internal dimensions of HYATT Hy-Roll bearings are so closely controlled, HYATTS run smoothly and quietly, last longer, and prevent equipment trouble due to excessive heat and vibration. You will find full selection and application data in HYATT General Catalog 150, or call your nearest HYATT Sales Engineer. HYATT Bearings Division, General Motors Corporation, Harrison, New Jersey. Sales offices at Harrison, New Jersey; Pittsburgh, Pennsylvania; Detroit, Michigan; Chicago, Illinois; and Oakland, California.



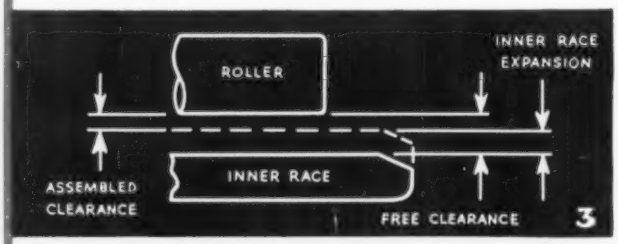
CONCENTRICITY OF RACE DIAMETERS

Concentricity of race diameters is usually defined in terms of wall variation, Figure 1, of the individual races, and radial run-out of the assembled bearing. The latter is generally a user's inspection where the bearing is mounted on an arbor, Figure 2, having a slight taper (.0001" to .0002" on the diameter per inch of length) and the radial run-out indicated as shown by turning either the arbor or the outer race one revolution while the other member is held stationary and noting the difference between the minimum and maximum readings. Industry standards are available which indicate what values are acceptable.



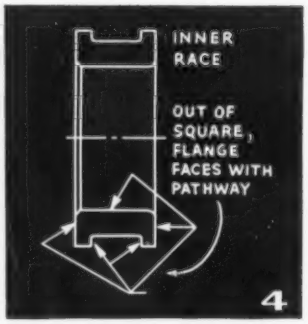
UNIFORMITY OF ROLLER DIAMETERS

Roller diameter uniformity, which is also necessary to running smoothness, is obtained by segregating the rollers into diameter variation classes of .00005", .0001" or .00015", depending on bearing size and quality grade and assembling only rollers of the same class into a given bearing. Rollers are then matched with races which are segregated in a similar manner in order to control the diameter over or under the rollers, which governs the internal clearance spread of the mounted bearing. Figure 3 (magnified)



SQUARENESS OF RACE AND ROLLER ENDS AND FLANGE FACES

Figure 4 indicates the face surfaces which must be square with each other within minute tolerances depending on the grade of the bearing. This is to prevent roller skewing with consequent heating and noisy operation. The roller ends must also be square with the diameter for the same reason. End square tolerances are usually less than .001" for the most frequently used sizes.



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HYATT HY-ROLL BEARINGS FOR MODERN INDUSTRY

best on every point

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To leap the hurdle of competition, a product needs performance born of quality. And Crucible's REX® high speed steel has it – in accurate size . . . sound uniform structure . . . dependable response to heat treatment . . . optimum tool performance.

Now, thanks to improved manufacturing techniques, REX is even better – more uniform. Put it to work on your next job, and you'll quickly know why REX is today, as it has always been – *the standard by which all other high speed steels are compared.*

Call for REX at your local Crucible warehouse. Or order it directly for prompt mill delivery. And for a list of available data on REX and other Crucible *special steels*, write now for a free copy of the "Crucible Publication Catalog". *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

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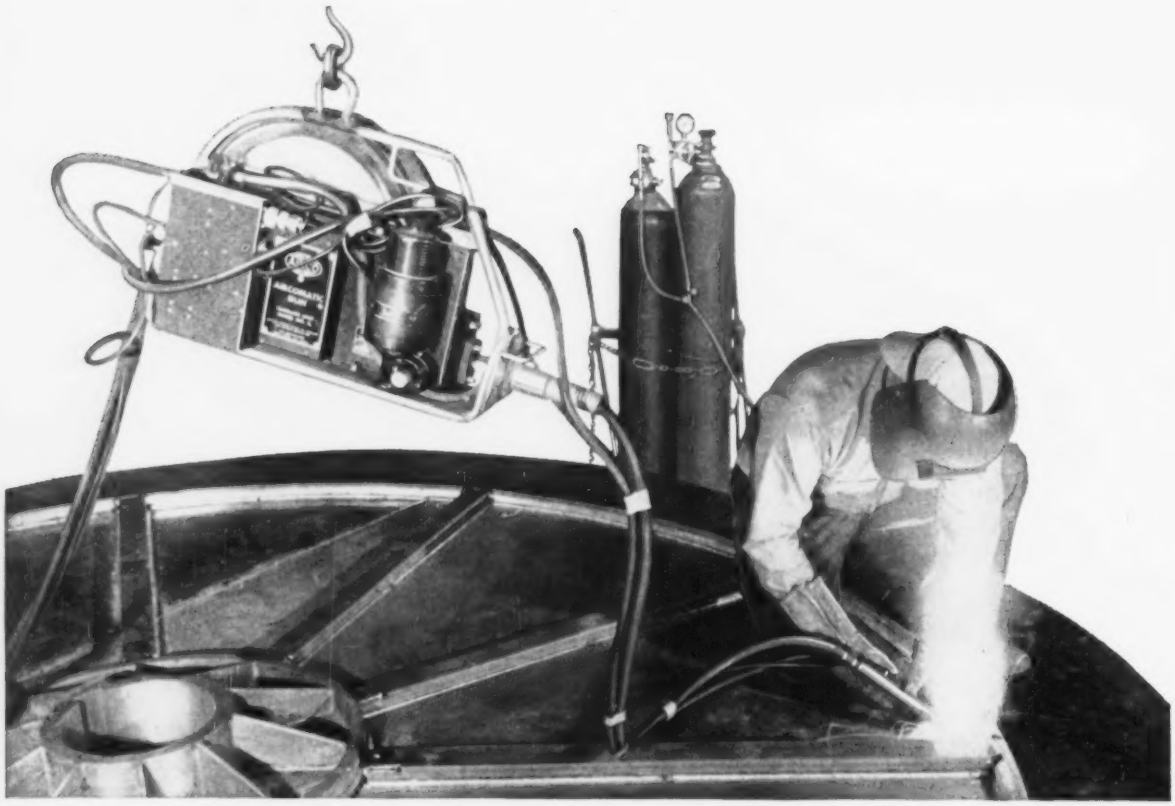
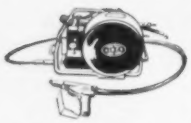


a complete **AIRCOMATIC**® "package"...from recommendation to results



Aircomatic welding is an inert-gas, shielded arc process using a consumable wire electrode. The basic unit, manual or automatic, designed and manufactured by Airco, includes the welding head, carriage assembly for wire drive and control equipment, cables, hoses, and flexible wire casing.

The consumable wire electrode is produced to rigid Airco specifications as to purity, cast, and metallurgical content. Normally supplied on expendable spools, Aircomatic wire is available in aluminum, steel, stainless steel, nickel, titanium, copper, and copper base alloys.

Airco shielding gases include both helium and argon, produced by Airco, or mixtures thereof for particular requirements. Pure carbon dioxide gas is also available from Airco for use as a shielding medium where applicable.

Aircomatic is a direct-current welding process. A complete line of Airco motor-generator and rectifier type welders are designed for Aircomatic characteristics—the latest of which is a new 800 amp ACV welder.

The Aircomatic process was invented, designed, developed, and licensed by Airco. Airco's nine years of experience have given the metal working industry an inert-gas process that welds all kinds of metals – adding speed, economy and versatility to every suitable application.

An Airco Representative can give you a completely unbiased opinion as to how Aircomatic can best be employed—because—Airco is a leading manufacturer-supplier of all types of oxyacetylene, metallic arc and inert-gas shielded welding and flame cutting processes, their controls, supplies, and accessories.

Other Airco inert-gas welding processes include Aircospot and Heliwelding. Write today for details.

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Products of the divisions of Air Reduction Company, Incorporated, include: **AIRCO** — industrial gases, welding and cutting equipment, and acetylenic chemicals • **PURECO** — carbon dioxide — gaseous, liquid, solid ("DRY-ICE") • **OHIO** — medical gases and hospital equipment • **NATIONAL CARBIDE** — pipeline acetylene and calcium carbide • **COLTON** — polyvinyl acetate, alcohols, and other synthetic resins.

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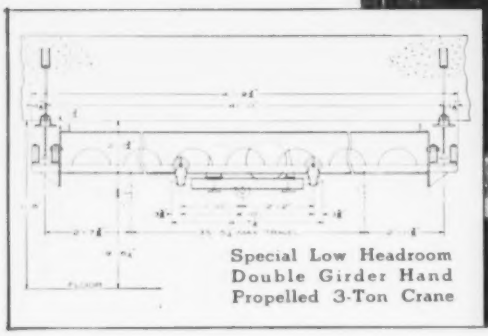
3 ton, 41'-0" span Cleveland Tramrail double-girder hand-propelled crane with electric hoist handling a heavy electrical machine.



Special Low Headroom Double Girder Hand Propelled 3-Ton Crane

Low-headroom Crane Enables 25% Production Increase

A MANUFACTURER of heavy electrical equipment ran against a serious production problem because of its rapid growth and inability to expand its building area.

An overhead crane was felt to offer a way of alleviating the situation. Conventional crane designs were studied, but they were unable to provide height of lift required by 24 inches or more.

The solution was found in a special Cleveland Tramrail crane of low-headroom design. This crane has two girders spread apart so the trolley can operate between them and also permit the hoist hook to be raised above the bottom of the girders.

Various lifting and moving jobs can be done easily, quickly and more safely with the crane. For instance, setting a heavy machine on a skid and preparing it for shipment, formerly required valuable man-hours; now with the crane, it only takes one-third of a man-hour—thus is done many times faster.

The tremendous increase in production made possible by the crane has astonished everyone. It enabled an increase in output by approximately 25 percent.

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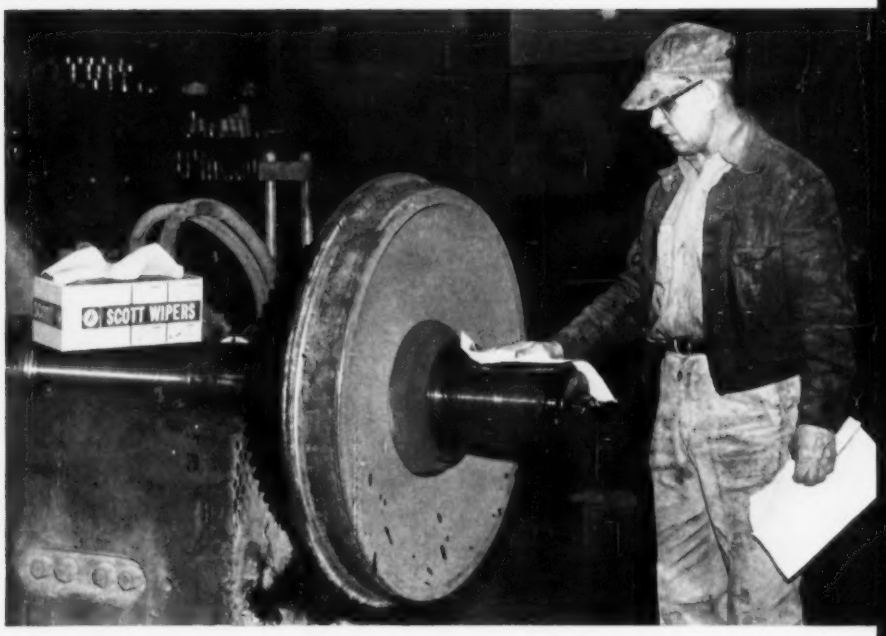
Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 4827 E. 290 ST. • WICKLIFFE, OHIO



Scott Wipers really help remove the dirt from these big axles, preparatory to regreasing, at the Lindenwood shops of the Frisco Railway. Scott Wipers are 2-ply paper, chemically treated and then "perf-embossed." This exclusive process* creates angled surfaces which provide thorough cleansing action and speed absorption of oil and grease.

WIPER PROBLEM? Look what Frisco did with Scott Wipers!

The St. Louis–San Francisco Railway Company—widely known as Frisco—was concerned with the safety hazards, the high costs and other unsatisfactory features in its use of cloth wipers. The switch to Scott Wipers two years ago solved many of these problems.

Scott Wipers are used throughout Frisco's Lindenwood shops at St. Louis and its shops at Springfield, Missouri, where the big diesels are overhauled and serviced. Formerly, workers frequently used cloth wipers beyond their saturation point—"wiping on as much dirt as they wiped off." Now Scott Wipers are discarded as soon as they've wiped the dirt and grease away. When workers wipe their hands, they like the cleanliness and sanitation of Scott Wipers—and when used fresh from their "pop-up" box, there are no hidden pieces of metal which might cut or scratch. And Scott Wipers save time and money with their low unit cost as compared with the purchase, handling and laundering of cloth wipers.

Scott Wipers are being used for a wide variety of industrial wiping operations, including many involving solvents. Want more details? Just call your local Scott representative or distributor. Or write Scott Paper Company, Department IA-74, Chester, Pennsylvania.

SCOTT PAPER COMPANY

Makers of the famous Scott paper products you use in your home.
Consult your local TV schedules for Scott's program, "Father Knows Best."

*Patent pending

Republic

POSITIVE HOLDING-POWER of Republic Nylok Bolts keeps striker plate in precise position to assure proper functioning of safety door-latch. Other advantages of Nylok Bolts include their liquid-sealing ability. When unit is fully seated in tapped hole, nylon pellet blocks escape of fluid around helix of threads.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

Nylok® Fasteners Assure Positive Performance

of Safety Door-Latch Design

There is no room for error in safety engineering. Not even in the smallest detail. That's why Ford Engineers use Republic Nylok Bolts to anchor striker plate to door post.

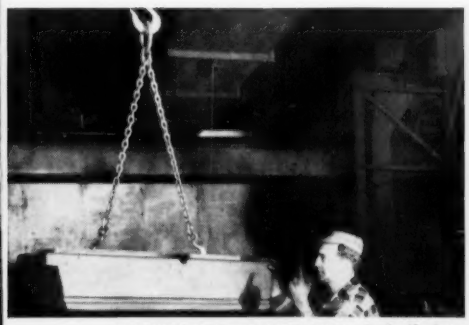
Nylok Bolts permit precise positioning of striker plate to safety latch during assembly. When torqued tight they provide a positive, vibration-proof clamping action to keep the plate locked in place. Holding-power of latch assembly is permanently maintained.

Republic Nylok Bolts have proved ideal for a wide variety of bolted assemblies subject to impact or vibration. Their relentless grip is produced through compression of a small nylon pellet imbedded in the bolt body when unit is wrenched into threaded hole. In attempting to regain its original shape, the pellet exerts a continuous, powerful lateral thrust, forcing a strong metal-to-metal lock between opposite mating threads. Lock is positive, whether or not bolt is seated. Further, this resiliency of nylon provides excellent adjustment and re-usability characteristics, and permits relatively soft materials to be locked to threaded members without damage.

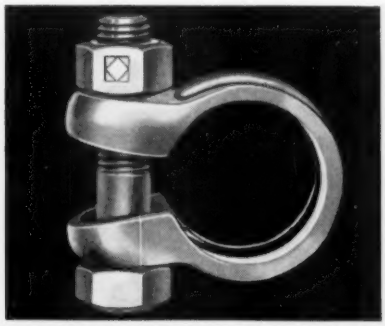
In addition to design advantages, use of Republic Nylok Bolts offers many production savings. They can be hand or power wrenched with equal effectiveness. There is no galling of threads or seating surfaces. Expense of assembling extra locking devices or wiring is eliminated.

Finally, you get all the advantages of Nylok locking plus top fastener quality when you specify Republic Nylok Bolts. Complete manufacturing control from ore to finished product is your assurance of consistent peak performance.

For full information, contact your nearest Republic office. Or mail coupon.



DEPENDABLE PERFORMANCE is built into Republic Chain Slings by careful control of every manufacturing step from raw ore to finished product. Available in single, double, triple, and quadruple types—in carbon and alloy steels and wrought iron. All assemblies, including matched accessories, are proof-tested before shipment. For illustrated Chain Sling Catalog, ADV-719, mail coupon.



REPUBLIC NYLOK NUTS provide safe, simple, strong locking action, using the same nylon pellet principle as Nylok Bolts. They are ideal for automatic feeding because they assemble from either end. A vibration-proof lock is obtained wherever hand or power wrenching stops. Easy adjustment and re-use are assured by permanent resilience of pellet.

POSITIVE MANUFACTURING CONTROL assures quality in components or products, produced to your specifications by Republic's Pressed Steel Division. Facilities include presses capable of forming every gage stamping, up to the heaviest. Also, welding, brazing, riveting, machining, annealing, galvanizing, and painting operations are available. For information on extending your production capacity with Republic Contract Facilities, mail coupon.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
Dept. C-3841
3104 East 45th Street
Cleveland 27, Ohio

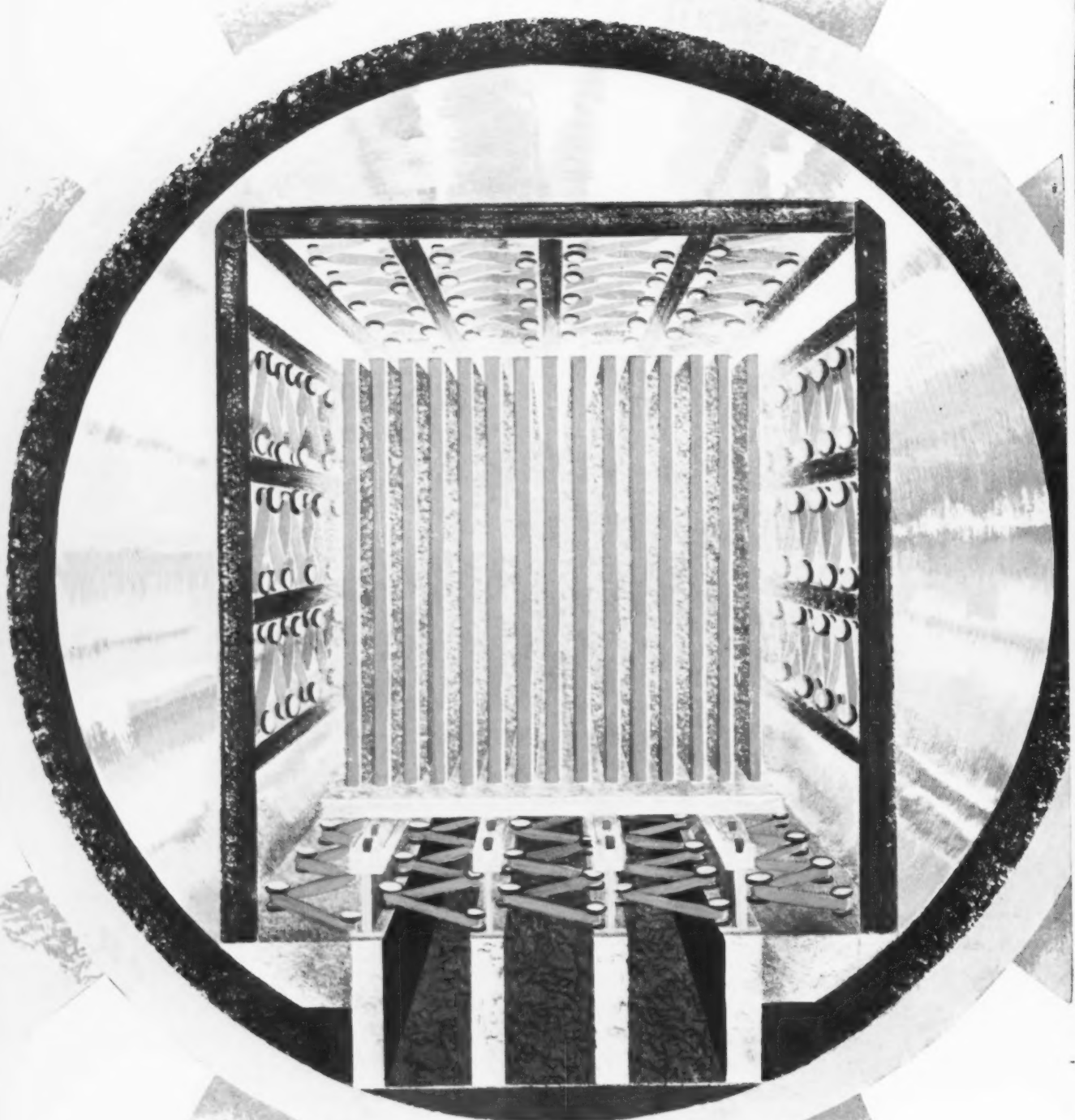
Please send me more information on:
☐ Nylok Fasteners. ☐ Contract Facilities.
☐ Please send me Chain Sling Catalog, ADV-719.

Name _____ Title _____

Company _____

Address _____

City _____ Zone ____ State _____

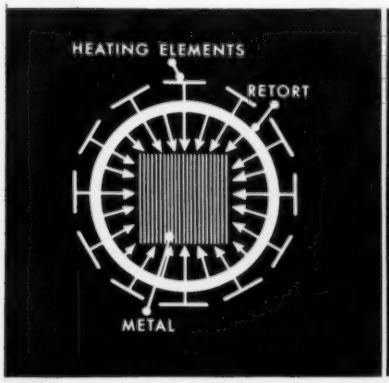


New Westinghouse Kold-Retort furnace speeds vacuum heat-treating of titanium . . . eliminates retort problems

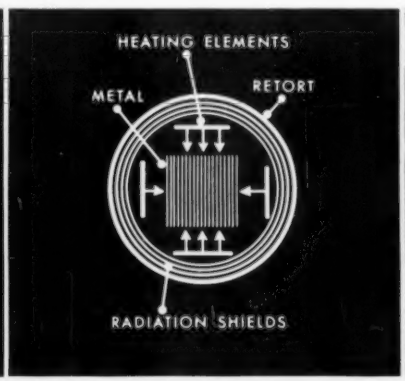
Kold-Retort® furnace design is a bold, original step to increase heating and cooling rates and lower production costs in processing reactive alloys.

It started with setting aside conventional furnace concepts. By co-ordinating vacuum equipment research with design and operating experience at Mallory-Sharon Titanium Corp., Westinghouse engineered more effective heat application.

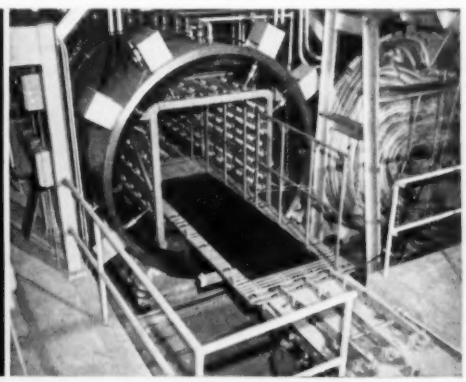
Conventional vacuum furnaces (A-below) depend upon radiation of heat to the retort which then radiates it to the charge. Kold-Retort design (B) places the heating elements inside the retort and uses radiation shields for insulation. Hence, there are no replacement costs for retorts distorted by frequent heating cycles.



A-*Conventional furnace design*



B-*Kold-Retort furnace design*



C-*Kold-Retort furnace in operation at Mallory-Sharon Titanium Corp., Niles, O.*

Kold-Retort furnaces (C) have been built with charge capacities up to 4 x 4 x 12′ long and for temperatures up to 3200°F. Because the retort remains cold, there are no size limitations. Preliminary work has already been done on a unit 20 x 12 x 50′ long for brazing complete aircraft wings at 2150°F.

This new Westinghouse design can be a practical answer to lower your costs in vacuum annealing and degassing of titanium and zirconium alloys, bright annealing of stainless steels, and in high-temperature brazing of intricate structures. It's another example of the way Westinghouse helps you Power-Up . . . to get better production and profit from your electrical dollar. Write Westinghouse Electric Corporation, Industrial Heating Division, Meadville, Pa.

J-10467

YOU CAN BE SURE...IF IT'S Westinghouse

Does your **Cylindrical** *problem call for a* **Centrifugal** *solution?*

If your product plans call for hollow cylindrical parts, give some thought to these facts. Manufacturers who had never seriously considered cast parts before are discovering important advantages in Sandusky centrifugal castings.

They're getting exceptional resistance to heat, corrosion, abrasion and stress, through the use of special alloys cast centrifugally . . . in diameters from 7" to 54", and lengths to 33 feet depending on diameter . . . and specially machined to specifications.

How can our versatile staff and facilities help you? Tell us your product requirements. Let us explore your ideas. Perhaps we can help solve your cylindrical problems through the vast foundry experience, metallurgical research and machining skills our 46 years offer.

Your request will bring more information promptly . . . or, if you prefer, a personal call by one of our engineers. Sandusky Foundry and Machine Company—Sandusky, Ohio.

Sandusky centrifugal castings offer you 4 important advantages:

1. ***SUPERIOR STRENGTH***—through non-directional mechanical properties
2. ***BETTER QUALITY***—machined castings are porosity-free
3. ***UNIFORM SOUNDNESS***—harmful inclusions are forced out by spinning motion
4. ***JOB-READY FINISHED CASTING***—reach you machined exactly to your specifications . . . eliminating extra costs from rejects, down-time, loss of production, etc.

Sandusky Centrifugal Castings

Stainless steels—plain carbon and low alloy steels—wide variety of copper base compositions

See Our Booth #1339 at the Design Show

specialized, stylized, modernized for automotive and appliance industries

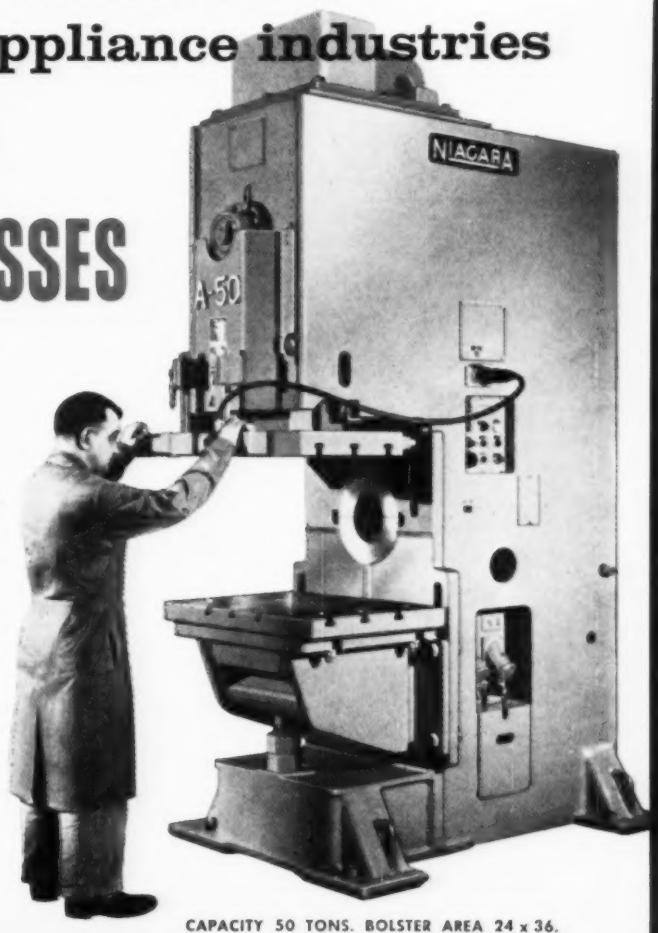
THE LATEST WORD IN ADJUSTABLE BED PRESSES

Trim, compact and versatile — this is Niagara's brand new version of its Adjustable Bed Press for the mass production industries. Designed for secondary operations between automated presses in the production line, it embodies specialized features for automotive and appliance manufacturers.

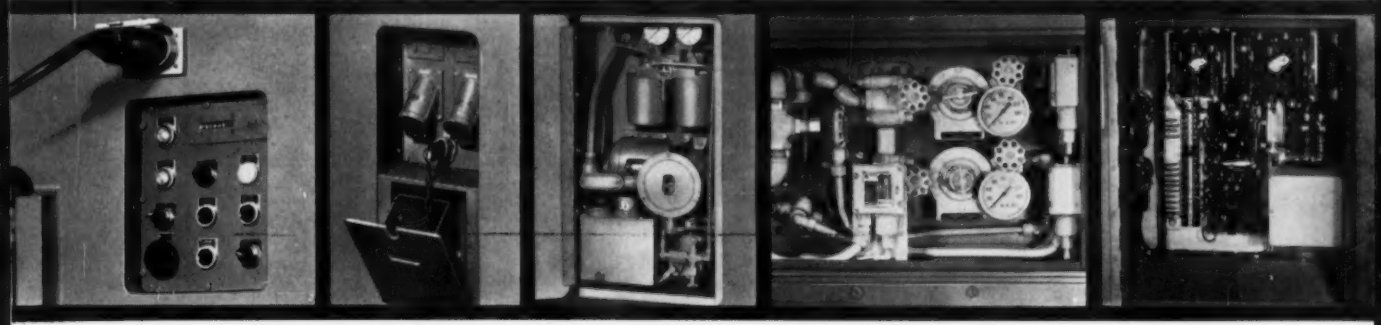
Everything about this press is geared to promote faster, safer and more efficient operation . . . the smooth streamlined exterior of its modern front-to-back crankshaft design . . . absence of overhanging and protruding parts . . . complete drive (gears, flywheel, air friction clutch and brake) fully enclosed within frame . . . up-to-the-minute controls and devices neatly recessed in the frame or completely housed behind flush panel doors.

Examine it. No press in this category can match such a combination of design and operating features . . . such space-saving compactness. It's easily moved too! With lifting lug and skid type feet, you can readily hoist or pull this press to any location within your plant.

WRITE TODAY for full details on this new model, as well as the complete standard line of Niagara Adjustable Bed Presses . . . (14 to 150 ton capacities). Request new Supplement and Bulletin 60E.



CAPACITY 50 TONS. BOLSTER AREA 24 x 36.



OPERATOR'S PANEL features deluxe controls conveniently arranged for fingertip direction of press operations.

AUX. POWER SUPPLY & SAFETY BLOCK. Receptacles (440V. and 110V.) for automatic equipment, conveyors, portable tools, etc. Safety plug, chained to safety block, de-energizes entire press control when removed from receptacle.

AUTOMATIC OIL CIRCULATING SYSTEM sends clean, filtered, metered flow of oil to all bearings and gears in crown, air counterbalance, slide gibs and barrel adjustment. Correct operating oil pressure is maintained, or press stops automatically.

AIR CONTROL PANEL houses air line filter, pressure regulators, gauges, blow-off valves for clutch and counterbalance, flywheel brake and motor cutout switch behind dust-tight door.

COMB. MOTOR & PRESS CONTROL in dust-tight enclosure flush mounted in rear frame, houses disconnect switches, circuit protection, transformers, fuses, control relays and starters for main motor and lubrication pump.

NIAGARA

NIAGARA MACHINE & TOOL WORKS, BUFFALO 11, N. Y.

DISTRICT OFFICES

Buffalo • Cleveland • Detroit • Indianapolis • New York • Philadelphia

Distributors in principal U.S. cities and major foreign countries

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work.

A Boeing B-47 Stratojet medium bomber gets a take-off assist from 30 Phillips Petroleum Company M15 JATOs.

N-A-X HIGH-TENSILE is readily formed and welded. Here, before welding, a worker sizes the container's aft head, drawn by a 250-ton press. Bottom forging is locked in.

N-A-X HIGH-TENSILE STEEL FORMS AND WELDS READILY

Formability: Even at the higher strength levels (50% greater than mild carbon steel) this material can be cold formed and drawn into very difficult stampings and cold formed shapes.

Weldability: Its weldability by any process is excellent, maintaining toughness through a wide range of temperatures. Under-bead cracking tests are excellent. Using American Welding Society standard bead-weld testing, shows under-bead hardness rises only to 95 Rockwell from 80-85 Rockwell prior to welding.

Make *your* product better, too—
with this high-strength steel

How N-A-X® HIGH-TENSILE STEEL

supplied the money-saving answer to a critical take-off problem

JATO rockets boost heavily laden planes into the air faster, let them operate from shorter runways. A new JATO developed by Phillips Petroleum Company required a case that would endure a pressure of 1,000 pounds per square inch at the high blast temperatures. Yet it must be lightweight, easily fabricated, economical.

In 1954, 100 JATO cases of N-A-X HIGH-TENSILE steel were tested at Air Force Plant 66 near McGregor, Texas, where Phillips Petroleum is contractor-operator.

Result: The N-A-X HIGH-TENSILE case passed every test with flying colors. It *surpassed* the required standards for strength by as much as 20 percent.

The high-strength characteristics that make N-A-X HIGH-TENSILE a better steel for JATO fuel containers also make it better for many other types of pressure containers, where high strength and lighter weight are equally important. It is particularly suitable for Propane cylinders and pressure vessels for the chemical, automotive and oil industries, that must withstand severe interior pressures and handling abuses . . . and for such products as truck and trailer frames, wheels and bumpers, railroad and earth-moving equipment, shipping containers, pipe, and many others.

Other Important Advantages: N-A-X HIGH-TENSILE STEEL, compared with carbon steel, is 50% stronger • has high fatigue life with great toughness • is more stable against aging • is more resistant to atmospheric corrosion. It polishes to a high luster at minimum cost • has greater resistance to abrasion or wear • offers greater paint adhesion.

With N-A-X HIGH-TENSILE you can design longer life, strength with lightness, and economy into your products. Let us show you how.

COMPANION HIGH-STRENGTH STEEL IN THE N-A-X FAMILY

N-A-X FINEGRAIN. A low-alloy high-strength steel ideally suited for applications where the enhanced resistance to atmospheric corrosion of N-A-X HIGH-TENSILE is not required.

N-A-X HIGH-TENSILE STEEL

N-A-X Alloy Division
GREAT LAKES STEEL CORPORATION
Detroit 29, Michigan — Division of
NATIONAL STEEL CORPORATION

N-A-X Alloy Div., Dept. A-1,
Great Lakes Steel Corp., Detroit 29, Mich.

☐ Please send me 8-page illustrated technical catalog on N-A-X HIGH-TENSILE Steel.

☐ Please have your representative contact me.

Name_____ Title_____

Company_____

Street_____

City_____ Zone_____ State_____

Another example of THERMALLOY quality control at work*

PREVENTIVE THERAPY

...the next "patient" can be your casting

Trained radiographers x-ray Thermalloy castings, such as pots and muffles, completely . . . not just at points of expected stress. *All* Thermalloy castings must pass x-ray inspection, surface tests or pressure tests, where experience indicates that stress can be normally expected.

Let us work with you on heat-treat problems. Our engineers can help you select the right grade of Thermalloy high-heat-resistant alloy and proper casting techniques for your particular application. Electro-Alloys has complete metallurgical and physical test labs, and works closely with the extensive headquarters research facilities of American Brake Shoe Company.

Call your nearby Electro-Alloys representative, or write for Thermalloy application bulletin T-225. Electro-Alloys Division 8014 Taylor Street, Elyria, Ohio. *Reg. U. S. Pat. Off.

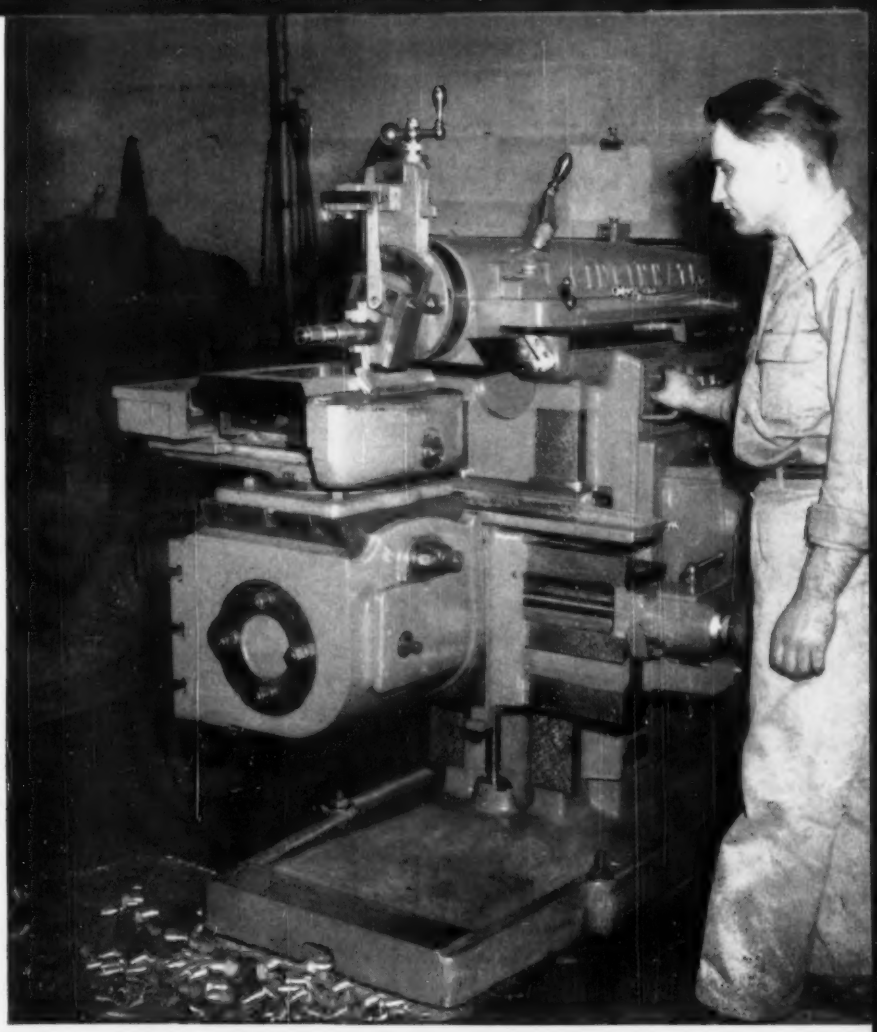
HEAT-RESISTANT CASTINGS • RADIANT TUBES
MUFFLES • RETORTS • CONVEYOR BELTS • TRAYS

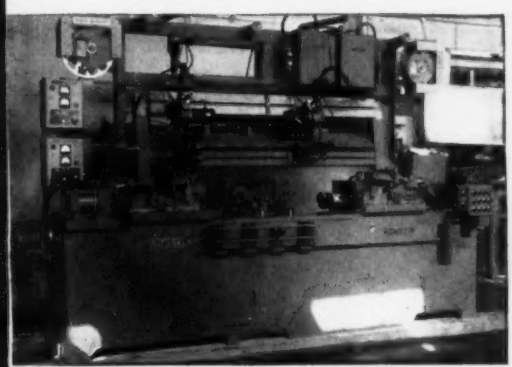
AMERICAN Brake Shoe COMPANY **ELECTRO-ALLOYS DIVISION** Elyria, Ohio

Accurate heavy cuts by this Cincinnati Rigid Shaper

. . . at NATIONAL ELECTRIC WELDING MACHINES CO.

Bay City, Michigan





The steel slide being machined will be used on a National Automatic MIG arc welder, such as shown above.

Economical production of this steel slide for an automatic arc welder requires heavy cutting with maintained accuracy. The machine chosen for this job is a 16" Cincinnati Heavy Duty Rigid Shaper. Some of the features which make this performance possible are:

- Extreme rigidity due to heavily ribbed column.
- Exclusive Cincinnati 50 PSI pressure lubrication.
- Maximum accuracy due to extended ram bearing and slot-free ram.
- Fast, easy operation due to electro-magnetic brake and clutch with finger-tip control.

Write **Department B** for Bulletin "CINCINNATI RIGID SHAPERS". We also suggest you consult our Application Engineering Department on your machining problems.

Photos courtesy National Electric Welding Machines Co., Bay City, Michigan.

CINCINNATI

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

Reg. U. S. Pat. Off.

A new line

RYK

Major breakthrough in grease technology results in development of new thickening agent. New grease has greater high temperature stability, superior multi-purpose qualities, improved lubricating properties.

Check Chart Of RYKON Greases

Regular Line	Grade Consistency
RYKON Grease No. 0....	0
RYKON Grease No. 1....	1
RYKON Grease No. 2....	2
RYKON Grease No. 3....	3
Heavy Duty Line	
RYKON Grease No. 0 E.P.	0
RYKON Grease No. 1 E.P.	1
RYKON Grease No. 2 E.P.	2

STANDARD

STANDARD OIL COMPANY (Indiana)

of Standard Oil greases

ON GREASE

Standard Oil instituted a grease research and development project several years ago. The result of this work is the line of RYKON Greases, which contain a new non-soap, organic thickener.

RYKON Greases surpass in stability and performance the best greases made up to this time. They bring to industry new opportunities for improved machine performance. They greatly reduce maintenance and grease handling problems.

RYKON Grease Properties

RYKON Greases are smooth, buttery-textured greases, made from the finest quality, solvent-extracted oil. Their thickening agent is a Standard Oil exclusive. RYKON Greases have these high-quality characteristics:

High temperature stability — Better heat stability than any other petroleum oil grease. ASTM dropping point of 480 F. Maintain consistency in service at high temperatures.

Mechanically stable — Maintain consistency even under severe mechanical working.

Chemically stable — Inhibit oxidation. Oil and thickening agent in combination possess extremely good chemical stability.

Oil separation — Minimum bleeding of oil in service and storage.

Wide temperature range — Lubricate at high and low temperatures. Extended range of application thus obtained makes RYKON Greases truly multi-purpose.

Water resistance — Do not lose consistency in presence of water. Resists water washout.

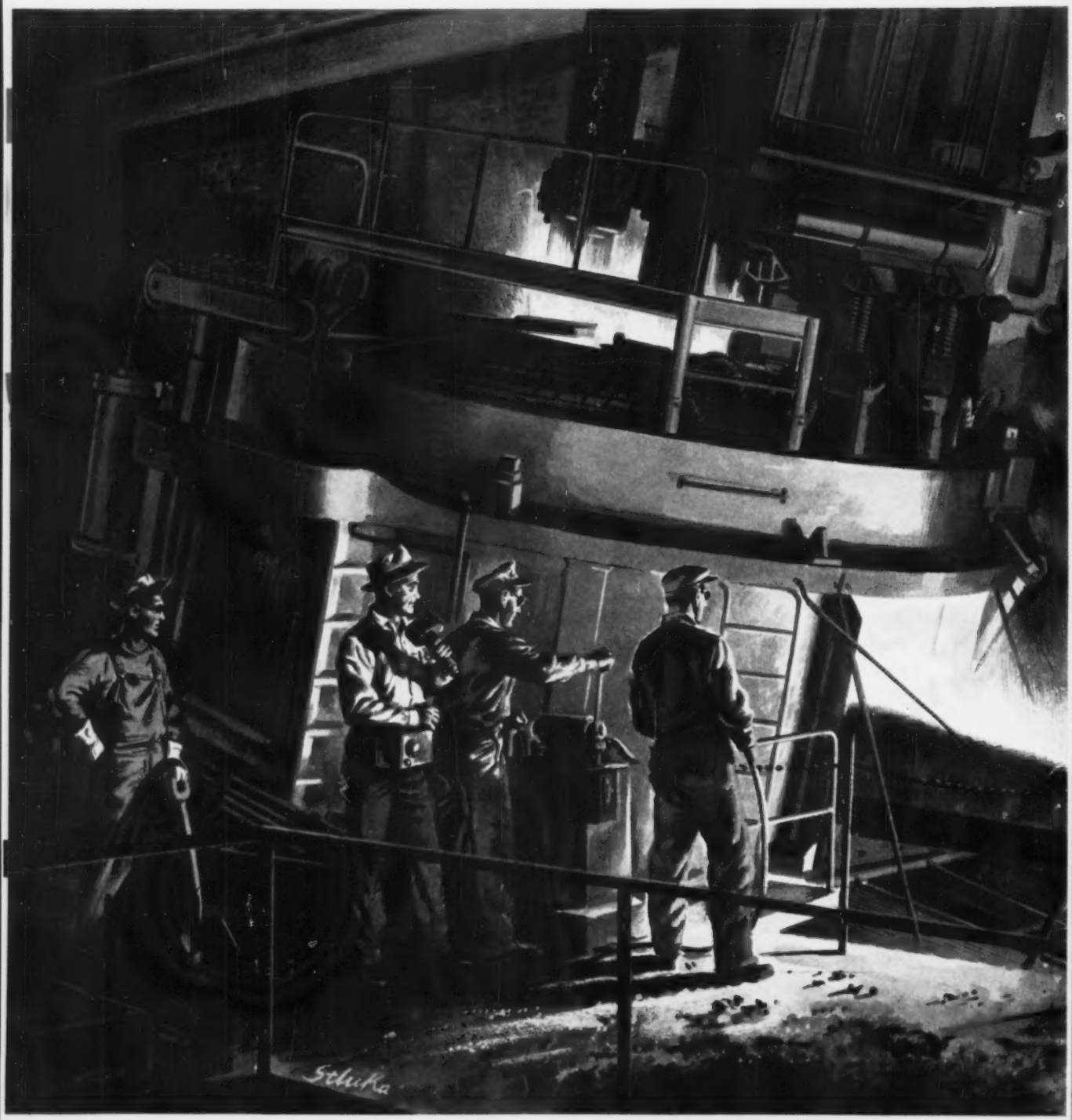
Anti-rusting — Exceptional natural rust preventive characteristics.

With RYKON Greases, lubrication can become simple, foolproof and less expensive—much less expensive, perhaps, than a single shut down caused by equipment failure due to the use of the wrong grease or the use of an "economy" grease.

RYKON Greases come in four Regular and three Heavy-Duty grades. Thus there is a RYKON Grease to take care of every grease lubrication job. Using RYKON Greases plant-wide can reduce your grease storage requirements, simplify lubrication maintenance training, cut down record keeping, save on dispensing equipment and reduce investment in grease inventories.

Get more facts about RYKON Greases. Call your nearby Standard Oil industrial lubrication specialist in any of the 15 Midwest or Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

ALLIS-CHALMERS . .



Products for steel: motors, m-g sets, control, pumps, *Texrope* drive equipment, crushers, mills, screens, rectifiers, transformers, substations, switchgear, circuit breakers, turbine-generators, voltage regulators, blowers, compressors, synchronous condensers, and water conditioning equipment.

ALLIS-

. . . in Step with STEEL

The arc furnace

Reduced costs result when Allis-Chalmers control, transformers and switchgear are specified for arc furnace application. The reason: A-C offers these products as a specially-integrated electrical system — designed by experts in furnace requirements and backed by Allis-Chalmers 75 years of experience in supplying equipment to the steel industry.

Wherever steel goes — from mine to final processing — Allis-Chalmers equipment is available to keep quality high, keep steel moving fast and profitably. Contact the A-C representative in your district, or write to Allis-Chalmers, Milwaukee 1, Wisconsin.

Arc furnace switchgear provides safe, dependable protection for transformer and related equipment. Special alloys assure long arcing contact life under severe interrupting duty, keeping maintenance and downtime to a minimum.

Transformers are of well-balanced designs and built for heavy duty . . . performance has been proven in 25-30 years of repeated daily short-circuits in electrical furnace operation.

. . . and Control requirements are met by Magnetic Amplifier and *Regulex* controls which balance arc current with arc voltage to maintain desired arc condition automatically. These controls result in high tonnage per kwhr, long life for electrodes and furnace linings, and a minimum of maintenance.

CHALMERS

A-C ALLIS-CHALMERS

Regulex and *Texrope* are Allis-Chalmers trademarks.

A-5363

"PIPE ALLEY" it's called. And it's made up of connecting lines between refinery units and storage tanks. Over 70,000 feet of National Seamless Pipe are in this "alley" at a large midwestern refinery. National Tube offers 24 different tubing analyses for refinery use, each specifically designed for particular refinery conditions.

◀ CALLED A "CHRISTMAS TREE," this unique connection is the surface outlet for an oil well and two gas wells. In this, America's first triple completion well, are 12,646 feet of National Seamless Casing and 35,949 feet of National Seamless Tubing. Possessing strength and collapse resistance surpassed by no other oil country tubular products, National Seamless is—and rightly so—the oil man's consistent choice for the toughest jobs.

Backbone of a Hundred Industries...

NATIONAL SEAMLESS PIPE AND TUBES

What does USS NATIONAL Seamless Pipe have to do with a Christmas tree? Quite a lot, if it happens to be the type of Christmas tree that tops off an oil well. You'll find NATIONAL Seamless doing all jobs in all industries—carrying oil, gas and other products, for high-pressure purposes, or being used as the basic shape for hundreds of tubular mechanical applications.

NATIONAL Seamless combines to the highest degree such vital qualities as strength, safety and workability. Absolute uniform wall strength throughout and dimensionally accurate, NATIONAL Seamless Pipe and Tubes assure smooth installation and long, satisfactory service. Available in a complete range of steel analyses, wall thicknesses and diameters, every foot is produced to exacting standards by the world's largest manufacturer of tubular steel products.

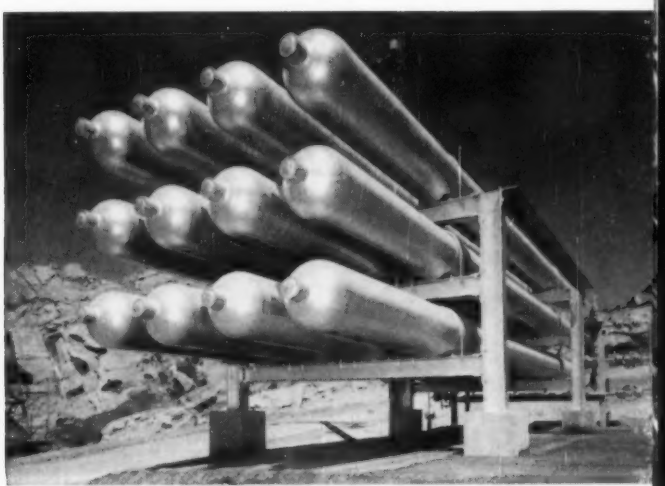
Bring your pipe and tubing problems to National Tube. Regardless of the application, our engineers are interested in discussing the problem with you.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS **NATIONAL SEAMLESS PIPE AND TUBES**

THE NATIONAL SEAMLESS METHOD of manufacture is one of the most difficult forging operations in the steel industry. A billet of the finest steel is actually pierced to produce a seamless tube with absolutely uniform wall strength. No welds . . . no joints . . . no weaknesses.

THIS WRING-FIT BUSHING, manufactured from National Tube's Shelby Seamless Mechanical Tubing, makes possible a truly precision die set, which permits closer working tolerances and extends the life of the dies to a degree never before thought possible. The bushing is harder, stronger, more uniform, longer-lasting and better-fitting. What's more, manufacturing time is minimized, for when you use Shelby Seamless, the hole is already there.



GASEOUS NITROGEN STORED AT 3000 PSI—The Propulsion Field Laboratory of Rocketdyne is using USS National Seamless Steel Cylinders to store gaseous nitrogen at pressures of 3000 psi. The gas is used as a pressure source during tests of large liquid rocket engines. In any application, regardless of pressures, USS National Seamless Steel Cylinders provide the utmost in strength and dependability.

UNITED STATES STEEL

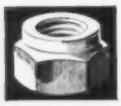
FLEXLOC MICROSIZE locknuts meet designers' needs for tiny precision nuts that retain strength and holding power in the smallest assemblies—servomechanisms, electronic and electrical equipment, all miniature devices.

New FLEXLOC Microsize Locknuts

Now available in Alloy Steel, Stainless Steel, Brass and Aluminum for lighter, more compact designs

SIZE	Across Flats		Hex. Height	Across Corners	Height
	MAX.	MIN.	REF.	MIN.	REF.
0-80 NF-3B	.111	.107	.046	.121	.075
1-64 NC-3B	.127	.123	.056	.140	.090
1-72 NF-3B	.127	.123	.056	.140	.090
2-56 NC-3B	.158	.153	.067	.176	.105
2-64 NF-3B	.158	.153	.067	.176	.105
3-48 NC-3B	.190	.183	.071	.210	.120
3-56 NF-3B	.190	.183	.071	.210	.120
4-40 NC-3B	.190	.183	.071	.210	.120
4-48 NF-3B	.190	.183	.071	.210	.120

SPECIFICATIONS: Available in brass (plain or cadmium plated) and aluminum (plain or chemically treated), for temperatures to 250°F; in alloy steel (plain or cadmium plated) and 18-8 stainless steel (silver plated) for temperatures to 550°F.



New FLEXLOC Microsize locknuts are smaller and lighter than regular FLEXLOCS of the same nominal diameter. Wrenches of smaller size are used to install them. Mating joints or flanges can be designed smaller—with no loss in strength or convenience of assembly.

Microsize FLEXLOCS have all the advantages of larger FLEXLOCS. One-piece, all-metal construction—nothing to put together, come apart, lose or forget. Use them as lock or stop nuts—they stay put anywhere on a threaded member as soon as the locking threads are fully engaged. Uniform locking torques insure accurate preloading. There are no nonmetallic inserts to pop out or deteriorate. Moisture, dryness, oil won't affect these Microsize FLEXLOCS. Just screw them on. They lock and stay locked. Vibration won't shake them loose.

For complete information on Microsize FLEXLOCS, consult your authorized SPS distributor. Or write STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.

STANDARD PRESSED STEEL CO.

FLEXLOC LOCKNUT DIVISION SPS

JENKINTOWN PENNSYLVANIA

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ROEBLING makes high carbon steel spring wire and flat spring steel... and makes it *better*... for every sort of spring and for every product that requires spring characteristics. Hard drawn, hard rolled, annealed or soft, tempered or untempered ... they're all available to meet your requirements exactly.

Among these Roebling materials are zig-zag and no-sag wires; mechanical and valve spring wires; music wire; clock and motor type spring wires; flat spring steel and upholstery spring wire of all types. The variety of parts into which these are formed is almost endless, but manufacturers all report that Roebling quality and uniformity reduce machine downtime.

Learn for yourself how Roebling can help your production and product. John A. Roebling's Sons Corp., Trenton 2, N. J.

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- *Ball Bearings*
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- *Tapered Roller Bearings* ("Tyson")

*Reg. U.S. Pat. Off. Tyson Bearing Corporation

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

. . . insist on *Carpenter* Stainless Tubing

Severe corrosion problems were encountered in handling hot flue gas and boiling lithium bromide solution in this generator for a gas-fired year-round air conditioner. The tubes transfer heat from the flue gas to boil a solution of 50% lithium bromide and water surrounding the tubes.

A change to Carpenter Stainless Tubing ended the corrosion problem. Handling this unusual combination of corrodents is just one more example of how Carpenter quality pays off in improved products and lower costs. There's a Carpenter Distributor as near as your telephone. Call him today.

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The Carpenter Steel Company
Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Carpenter

Stainless Tubing & Pipe

AL Stainless Steels
for the Process Industries

VARIOUS TYPES—Generally speaking, stainless steels are divided into three groups: chromium, chromium nickel, and chromium-manganese-low nickel steels. Their corrosion resistance, hardenability, tensile strength, etc., varies with the proportion of chromium, nickel and other alloying elements each type contains.

The chromium stainless grades are divided into two types: martensitic steels, which are hardenable; and ferritic non-hardenable steels. Both types are magnetic. The chromium nickel and chromium-manganese-low nickel stainless grades are austenitic steels, hardenable only by coldworking, and are non-magnetic.

The principal chromium stainless steels of chemical industry significance are Types 410, 431 and 440A martensitic grades, and Types 405, 430, 442 and 446 ferritic steels. Chromium nickel austenitic steels of principal importance are Types 302, 304, 316, 317, 347, 309 and 310. In the more recently developed chromium-manganese-low nickel austenitic group, Type 202 has physical and mechanical properties closely approximating those of Type 302—with the advantage of much lower nickel content and more ready availability in times of nickel shortage.

PRINCIPAL GRADES—Industry has called for quite an extensive range of chemical and physical properties in stainless steels. To meet these requirements, types have been developed which are best suited for a particular application: such as Types 316 and 317 for extra corrosion resistance, Types 309 and 310 for extra high temperature service, etc. Knowledge of these stainless steel qualities is essential for engineers and designers to create a product that will best do the work for which it was intended. Complete data on AL Stainless Steels is available in the various publications listed below.

Of all the stainless steels, the grades most used in the chemical and allied industries are Types 304, 316, 317 and 347 chromium nickel steels. The first three grades are also available in extra low carbon varieties to meet extreme conditions of fabrication or service which might carry the threat of intergranular corrosion. Designated Types 304L, 316L and 317L, these low carbon stainless steels are practically immune to carbide precipitation in the as-welded condition. Like Type 347, they permit the field-welding and stress-relieving of material of any thickness, for example, without the hazard of intergranular corrosion.

REGULARLY SUPPLIED FORMS—Allegheny Ludlum Steel Corporation is in position to furnish the various grades of stainless steel in all of the commercial forms required by fabricators of these metals. These include:

- Plates, including formed heads
- Sheets, either coiled or straight cut lengths
- Strip, either coiled or straight cut lengths
- Bars, rounds . . . flats . . . hexagons . . . octagons . . . squares or special shapes
- Billets, for forging or upsetting
- Angles
- Wire
- Tubing, seamless or welded
- Castings and smooth-hammered Forgings
- Extrusions
- Clad stainless

Information as to size ranges and mill tolerances are available in literature devoted to detailed discussions of AL Stainless Steels.

SPECIAL REQUIREMENTS—When selecting a grade of corrosion and heat resisting steel for a given application, it should always be borne in mind that laboratory tests, however carefully performed, can be expected at best to be only indicative of field performance. Variations in actual service conditions are so wide that a special study of the case at hand may be necessary at times. To that end, Allegheny Ludlum engineers and technical men are available for consultation on unusual problems involving stainless applications.

FABRICATION—AL Stainless Steels may be easily fabricated by any of the usual processes—welding, drawing, blanking, machining, spinning, forging, riveting, shearing, soldering, etc. In some instances, however, care must be exercised in handling of the material to preserve its corrosion or heat resisting properties. No one should undertake to fabricate any of the stainless steels without a full understanding of these handling procedures. Proper processing is fully discussed in Allegheny Ludlum literature—available on request.

RESISTANCE TO ATTACK—There is a wide range of conditions under which AL Stainless Steels operate in resisting corrosive attack at normal and elevated temperatures. Detailed information regarding their resistance to various media, heat resistance and strength will be sent upon request. See the publication list below.

STAINLESS CLAD STEEL—Allegheny Ludlum Stainless Clad is available commercially in the following commodities:

- Double Clad—Stainless both surfaces with carbon steel core. In plates, sheets and strip.
- Single Clad—Stainless one side only; plates only 3/16" and heavier.

Special clad materials on application.

PUBLICATIONS AVAILABLE

The following list of technical and service literature is freely available on request; just ask for the bulletins which contain the type of information you need.

Blue Sheets—An individual Blue Sheet, containing certified laboratory data on physical and chemical properties, etc. is available on each grade of AL Stainless Steel.

Fabrication of Stainless Steels—Contains valuable data for your shop men on various methods of handling, forming and finishing stainless steel.

AL Stainless Steel in Chemical Processing—36 pages on various applications, advantages, etc. of stainless in the chemical industry.

Stainless Steel Handbook—A case-bound book of 124 pages, containing complete data leading to the proper selection and fabrication, etc. of the correct grade of stainless for each application.

● Write to *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.*

ADDRESS DEPT. NO. A-881

W&D 5787

For Stainless Steel in ALL Forms—call

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Warehouse stocks carried by all Ryerson Steel plants

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Here's one source responsibility for the design, construction and service of a complete line for the production of almost any metal part or product.
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You'll want to know more about this sensible approach to modern metal fabrication. Have a Federal-Warco engineer show you one of these packaged lines in actual operation soon.
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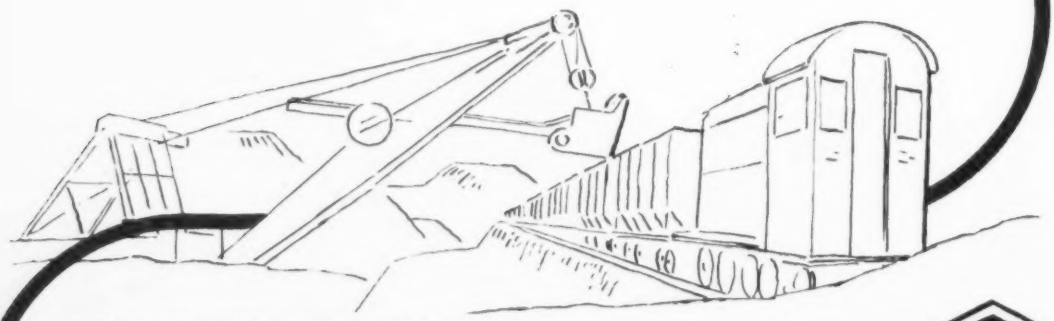
263

FROM START TO FINISH

ORIGIN

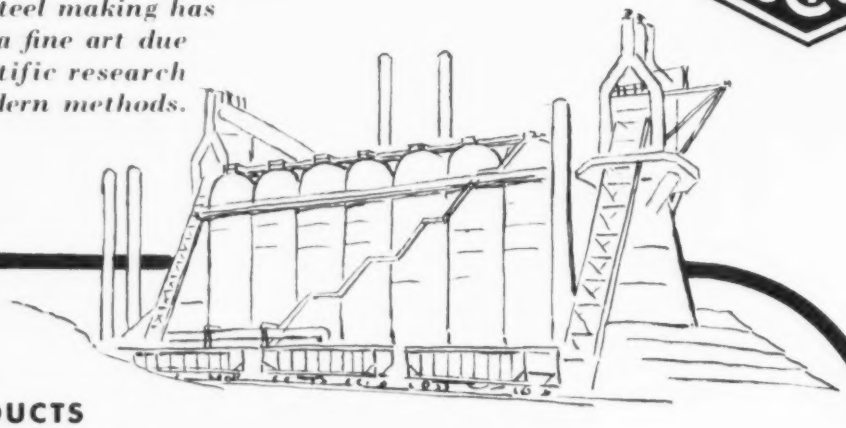
Cliffs iron ores are found wherever good steel is made.



STEEL MAKING "KNOW HOW"

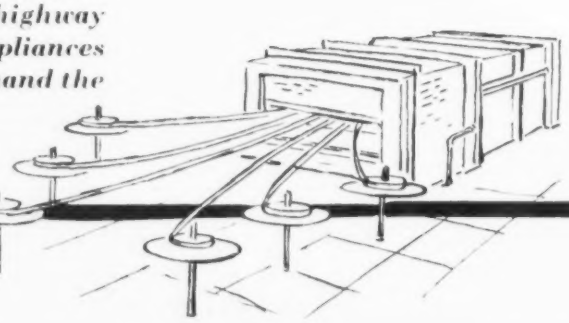
Today, steel making has become a fine art due to scientific research and modern methods.

CCC



STEEL PRODUCTS

In manufacture of fine kitchen, store, highway and auxiliary appliances steel makers demand the best iron ore.

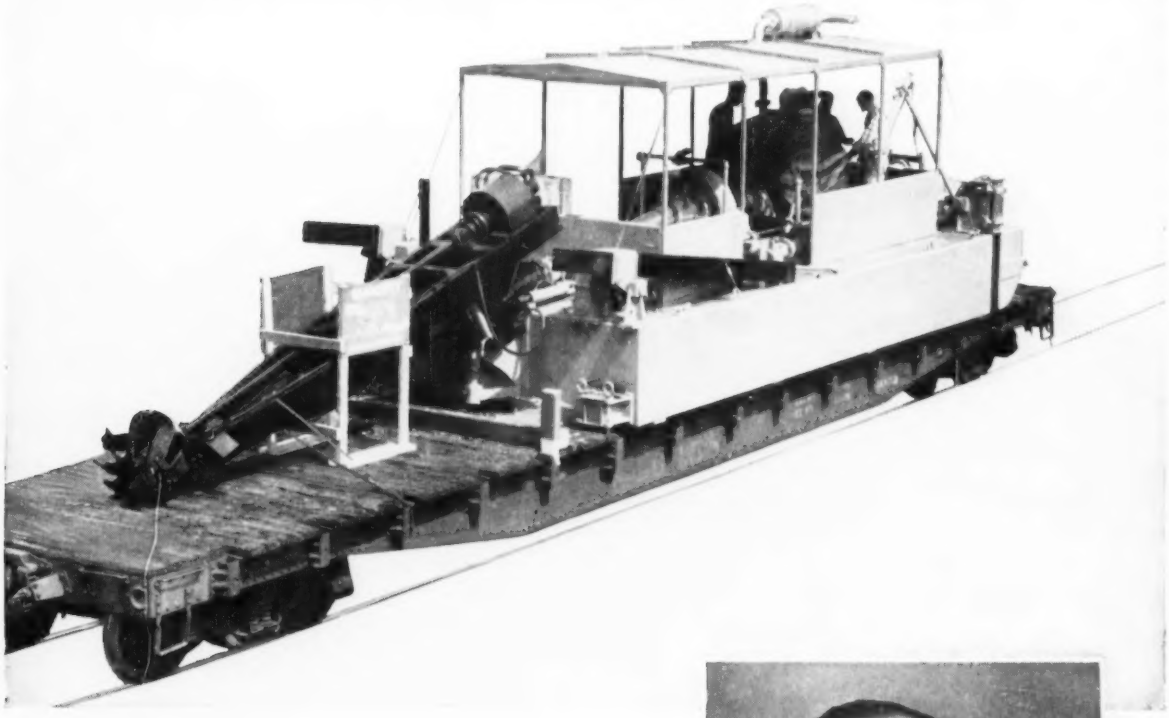


IRON ORE ★ ALLOYS ★ VESSEL TRANSPORTATION ★ COAL

The Cleveland-Cliffs Iron Company

UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

An Ellicott "Dragon" Dredge, constructed in part with Standard Steel Works forgings, ready for rail and freighter shipment to Hong Kong.



"To maintain our position of world leadership we must have superior service from our suppliers"

As suppliers of countless forgings to the Ellicott Machine Corporation for 30 years, we at Standard Steel Works feel we have been an integral part of the growth of Ellicott and in helping this world's largest dredge manufacturing company maintain its top position through all those years. We appreciate the fact that Mr. Mund and his associates realize it is not only by meeting design and steel analysis requirements for Ellicott, but also by consistently combining our know-how in steel fabrication with personalized attention to each order, that we have maintained our mutually satisfactory relationship. Every order we receive we accept as a service opportunity.

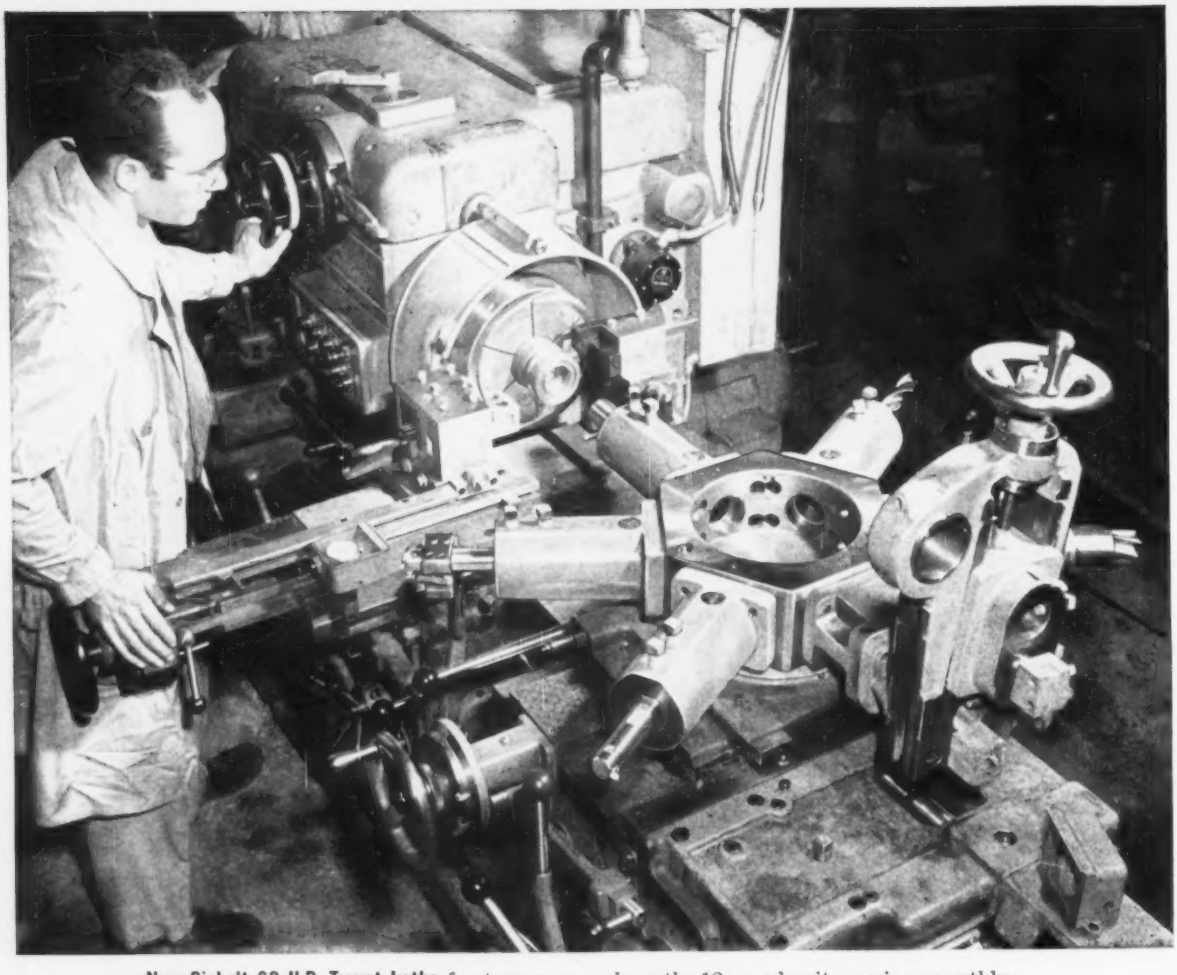
It is routine at Standard Steel Works to analyze all orders carefully and to present its requirements and possible problems on a personal, conference basis to the appropriate men in the shop; then to keep the customer continually advised on the progress of his order through our shops by means of frequent, periodic job-status reports. Our customers, whether they manufacture equipment for local use or for shipment to the far corners of the world, know that they can count on Standard Steel Works to deliver the right forgings at the right time—to help them maintain delivery schedules. Write or call Dept. 1D today and give us the opportunity to show you how our personalized service can prove invaluable in your operations.

"We are justly proud of our position as the world's largest designers and manufacturers of hydraulic dredges. Standard Steel Works is one of our suppliers which—in giving us that extra plus, superior service, while meeting our requirements for various forgings—have helped us maintain our world-wide leadership," *says Allan Mund, Vice President and General Manager, Ellicott Machine Corp., Baltimore, Md.*

Standard Steel Works Division

BALDWIN · LIMA · HAMILTON

BURNHAM, PENNSYLVANIA Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes



New Gisholt 30 H.P. Turret Lathe features a compact, integrated headstock, bedframe design. Nickel alloyed components help keep the 12-speed unit running smoothly . . . dependably at top performance. Produced by Gisholt Machine Co., Madison, Wisconsin.

Gisholt depends on nickel alloy steels for highly stressed parts in new saddle-type turret lathes

In Chuck Screws—carburized type 3312 nickel chromium steels with wear resistance plus a tough case to prevent thread chipping, and a strong core to carry heavy torsional loads.

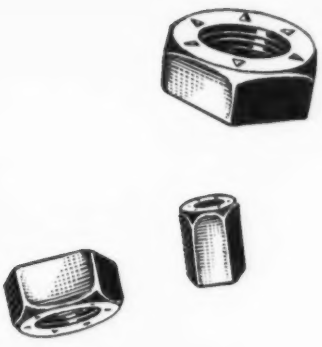
In Certain Headstock Gears—type 4620 Ni-Mo case-hardened to provide wear resistance and strength with a minimum of distortion during heat-treatment.

In Drive Pinions for Hexagon Turret Saddles—where 4340 Ni-Cr-Mo steel quenched and tempered to 40-45 Rc has proved its uniformity and reliability through years of service.

Three problem parts! Three practical solutions for Gisholt! All proved . . . with nickel alloy steels. What about critical metal parts in *your* products?

Chances are, too, that solutions to the problems they present lie in the outstanding combinations of properties available from steels containing nickel. Why not take advantage of Inco's available knowledge of the capabilities of nickel steels. Send us the details of your problem, and we will be glad to suggest possible solutions.

INCO **THE INTERNATIONAL NICKEL COMPANY, INC.** 67 Wall Street New York 5, N.Y.



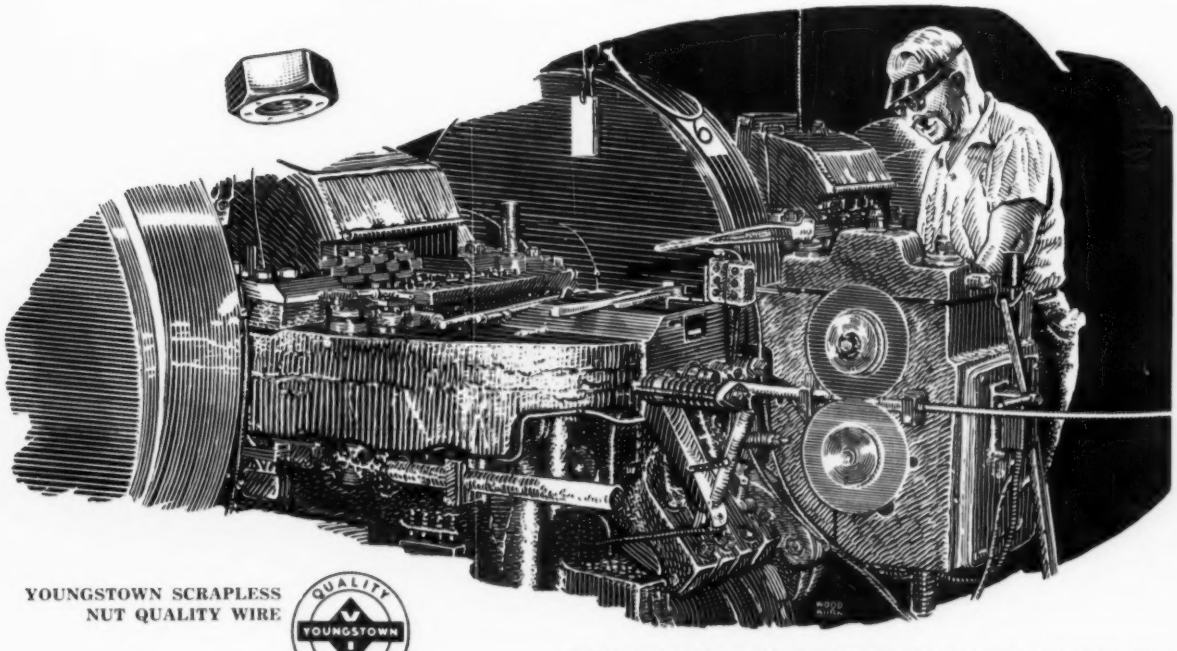
For over 50 years, leading manufacturers in all the major industries have used Gripco lock nuts to simplify production, lower manufacturing and maintenance costs and to improve the durability of all kinds of assembled products. To maintain this enviable reputation for outstanding product quality, the Grip Nut Company of South Whitley, Indiana, uses quality-controlled Youngstown Scrapless Nut Wire and Bars as basic raw material.

Because it comes to your plant free from all piping, injurious seams, laps, die marks, internal tearing and cupping, and non-metallic inclusions —Youngstown Scrapless Nut Quality Wire will provide increased production with fewer rejects which adds up to a healthy over-all profit boost. Also, its smooth coating extends die life thus minimizing costly die replacements.

YOUNGSTOWN SCRAPLESS NUT WIRE

Helps Maintain Quality of GRIP *Lock Nuts*

Youngstown Scrapless Nut Quality Wire is provided in special resulphurized steels as well as in standard AISI grades. Cold Heading Bolt Wire, of the same high Youngstown quality, is also available in all standard carbon and alloy analyses. Why not phone or write to our nearest District Sales Office for additional information or metallurgical assistance?



YOUNGSTOWN SCRAPLESS NUT QUALITY WIRE

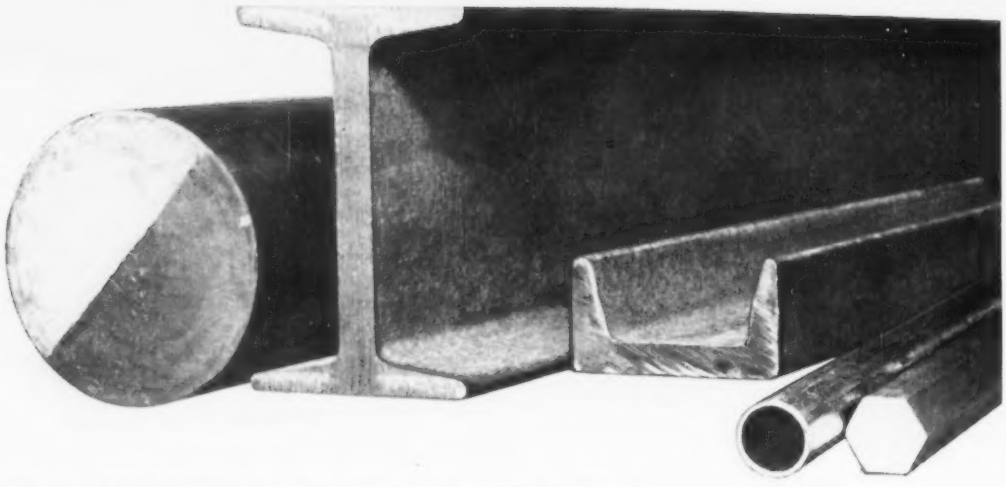
QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices - Youngstown 1, Ohio

District Sales Offices in Principal Cities



METAL WORKING MEN TELL US...

3 major reasons keep them coming to Ryerson:

Flame-cut steel shapes save you money—one piece or hundreds—almost die-cut accuracy.

1. Biggest stocks—nobody comes even close to the size and variety of Ryerson inventories.

2. Unequalled processing facilities—assuring fast, accurate service on any requirement.

3. Dependable, certified quality—at fair prices—whether steel is plentiful or scarce.

RYERSON STEEL

PRINCIPAL PRODUCTS IN STOCK

CARBON STEEL—bars • structurals • plates • sheets tubing, etc.

STAINLESS—Allegheny Metal pipe • tubing • sheets • plates bars, etc.

ALLOY STEEL—including case hardening, direct hardening, heat treated and Rycut free-machining leaded alloys.

OTHER PRODUCTS—safety plate • grating • expanded metal • chain • wire rope • reinforcing bars • plastic sheets • pipe & tubing • machinery & tools.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Foundrymen Raise Hopes

Steel foundrymen expect that they'll be pouring whole wing sections of high-temperature steel within the next 5 to 10 years. This, they think, will eliminate the need for forging and machining. It'll involve some sections as thin as ⅛ in. with tensile properties up to 300,000 psi. It's expected, too, that the sections will withstand temperatures as high as 1400°F without loss of strength.

Need For Continuous Data

There's a need for continuous reliable data on raw material and finished product inventories of steel consumers. This is pointed up by the current uncertainty about the status of stocks in the auto and appliance industries. Such data could have prevented the supply squeeze after the 1953-1954 inventory cutting spree—and a possible repetition after the present stock-cutting drive.

Par For Drawability Test

One of the big problems with deep-drawing steel is to try to estimate the material's drawability before it's used for actual drawing. One of the tests is the new Swift cup-forming test which the British have been evaluating. Results show that it has no particular advantage, but its reliability is on a par with other cup-forming tests.

Foresee Heavier Payloads

Lighter tractors and heavier payloads are likely to result from the interstate road network. This is based on the absence of sharp turns and stop lights, and the low grades. One firm is already saving on the initial cost of the lighter tractors. Yet, these combination vehicles are traveling a modern turnpike with average payloads which are 1500 lb heavier than before.

New System Tabs Time

An automated timekeeping system is paying off in plants where workers change frequently from job to job. The worker reports from a call box to a central tabulating office where the information is recorded on punch cards. At day's end, work time is balanced against total time. By not having its workers report to a timekeeper, one firm saved $36,000 in a year.

Closer Check On Stock

Auto producers told the government they're now playing production "close to the vest." They're still hoping for at least a 6.2 million unit year, but they're gearing purchases and inventories as close to production as possible. "We're in an inventory reduction now; we aren't warehousing any materials ourselves anymore. The pressure is on suppliers to deliver the right amounts of the right grades when we need them." So says an industry spokesman.

Plug For Continuous Casting

Continuous cast steel ingot appears to produce uniform mechanical properties. According to a recent report, ductility and impact strength of plates rolled from continuously cast slabs are somewhat higher than those obtained from conventional slabs. Another advantage is that all plates checked were entirely free of flaking.

Bargaining Still Tough

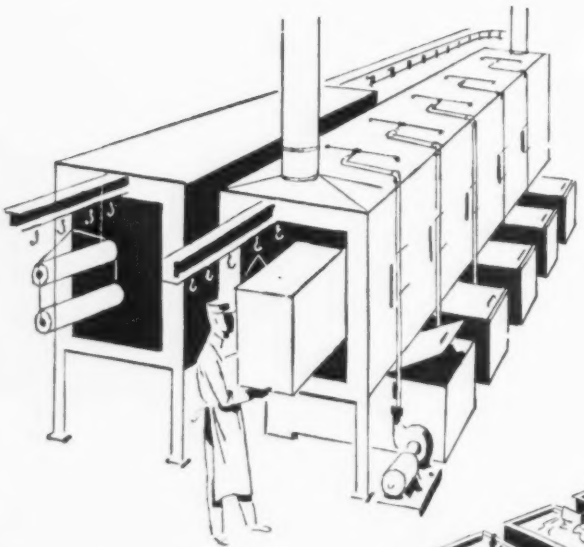
Don't count on Senate committee revelations of union wrongdoing to solve your labor problems. Organized labor will be just as tough around the bargaining table as ever. Demands for higher wages and other contract improvements will be coming along just as regularly as before. Whatever reforms come about in the House of Labor are not likely to weaken the unions' bargaining power.

Trend Up On Farm Machines

Makers of farm equipment are raising their sights higher on output for this year. Some selling advance stems from the need to replenish dealer stocks for the spring, but producers are scheduling a 20-pct boost in production for the next quarter over that of a year ago. Inventory plans have been revised upward for more hot-rolled sheet and bar—a change in thinking on decisions made only three to four weeks ago.

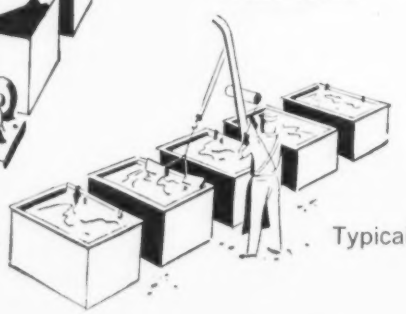
Treat Metals Fast and Economically

with ACP *Chemicals and Processes*



Typical power spray system.

ACP produces the chemicals for treating most metals—to clean them, to prepare them for further processing, to improve corrosion resistance and paint adhesion. It has the experience and the personnel to apply these chemicals economically and effectively, too. Here are just a few of the many products and processes ACP offers:



Typical immersion system.

ACP GRANODINE®—a phosphate coating process for steel which provides an excellent bond for paint and greatly improves the corrosion resistance of the paint system.

ACP ALODINE®—an amorphous coating process for aluminum which protects both painted and unpainted metal and anchors the paint finish.

ACP LITHOFORM®—a phosphate or chromate coating process which prevents objectionable chemical reaction between metal and paint, keeps paint on zinc and cadmium surfaces.

ACP DEOXIDINE®—a phosphoric acid metal cleaner which removes rust and organic soils, destroys rusters, prepares steel, aluminum, brass, copper and other metals for painting.

ACP METAL CLEANERS—Ridoline,® alkaline metal cleaner and Ridosol,® solvent-detergent metal cleaner—remove metal preservatives and metal working lubricants from metals in process.

ACP RODINE®—pickling acid inhibitors which reduce acid consumption, save steel. They also minimize pitting, burning and embrittlement and reduce the formation of acid fumes.

Write for the "ACP GUIDE to the chemical treatment of metals."

CHEMICALS ACP PROCESSES

AMERICAN CHEMICAL PAINT COMPANY, Ambler 20, Pa.

DETROIT, MICH. • ST. JOSEPH, MO. • NILES, CALIF. • WINDSOR, ONT.

New Chemical Horizons for Industry and Agriculture

Modern Marketing Opens Doors to Bigger Foundry Sales

It Takes Planning to Do the Job

With unprecedented vitality, the nation's foundries are reaching out for markets.

Space is being reserved in salesmen's kits for the latest merchandising tools.

Individual efforts sparked by trade groups.—By T. M. Rohan.

■ In the highly competitive foundry field, the concept of marketing is beginning to take hold.

Ruggedly independent foundrymen who for years relied on bid paring as their most potent selling weapon, now are turning to customer service, advertising campaigns, and market surveys as useful sales tools.

Demand Easing—It took a softening of markets for many foundries to get the message. An estimated $4.5 billion in ferrous foundry sales last year was one of the best years in history. When inventory-conscious customers began cutting down ordering early this year, the slower pace hurt.

As one foundryman put it: "Busi-

FORUM: Foundrymen map out strategy at Cincinnati.

How Foundries Can Develop Their Markets

INDUSTRY-WIDE ✓	INDIVIDUAL EFFORT ✓
✓ Utilize trade association.	✓ Know your customers' problems.
✓ Compile marketing data.	✓ Conduct market surveys.
✓ Hold national marketing seminars.	✓ Provide fastest possible service.
✓ Organize regional sales and engineering clinics.	✓ Improve quality of product, and sell it.
✓ Hold design contests.	✓ Cooperate on castings design.
✓ Organize product development meetings.	✓ Utilize accepted sales promotional tools.
✓ Provide advice and consultation services.	✓ Educate customers on advantages of castings.

Continued from P. 59

ness is good this year but it could be a lot better. But we can't expect to break records every year."

Show Coming Up—Still, the foundrymen like the taste of prosperity and they are out to put their new-found marketing techniques across with a bang. The merchandising programs will hit a big peak next month in Cincinnati (May 6-10) with the First Engineered Castings show, sponsored by the American Foundrymen's Society.

Among individual firms, one progressive small town foundry flies salesmen to customers and customers to the plant in a company plane. The company is confidently shooting for about 21 pct more iron sales this year.

Surveys Help—Another increased its customers by 40 pct through a marketing survey and good follow-up. One Michigan foundry specializes in re-working customers' castings. It now designs 20 pct of its volume from scratch and assists on another 20 pct.

Another pulled in 79 product designers for a 1-day design seminar

For new pointers on CO_2 molding, see P. 99.

New Marketing Tools Go To Work for Foundries

Gray Iron Founders Pull Together

▪ Working behind its marketing director, Richard C. Meloy, the Gray Iron Founders Society is laying bare the facts of merchandising to its members. (See above.)

Two exhaustive surveys uncovered some surprises. One which amazed many foundrymen and made others scoff was the revelation that purchasing agents are more interested in quality than price.

Another was that most product engineers were admittedly weak on castings design and welcomed good information. The Society is opening up the throttle in its marketing program.

A series of nine regional marketing clinics is in progress. The how-to-do-it talks delve into research, sales promotion, sales analysis, specifications, cost analysis and advertising.

A theme supplied by executive secretary Don Workman, "All boats rise with the tide," is credited, more than any other single element, with convincing foundrymen that by teaching each other how to sell, they are helping themselves.

Bolstering the work of its own staff, the Society retains consultants on technical work, sales, costs, accounting and other phases of management. For the chapters who request them, speakers are recruited for various occasions. Seeing these efforts pay off, the founders are turning more to their association.

Survey Boosts Orders Forty Percent

▪ Hansell-Elcock Co. mailed out questionnaires asking numerous companies what castings they bought. There was a 47 pct return. One salesman followed up with personal calls that weeded the active prospect list down to 1500. Out of these came an added 40 pct business.

Besides the extra volume and extra facilities, the foundry feels it has definitely established the size of the business within its marketing area. Management is assured it can set reasonable sales goals.

Because of its success in the last two years, Hansell-Elcock is planning a second survey to catch up with changes.

Helping Competitors Pays Off

▪ The oldest operating foundry in the U. S., Hunt-Spiller Co. of Boston, sends its sales manager out to show rivals how to sell better.

"We don't mind at all trying to make better salesmen out of our competitors," says Harold Brown, the sales manager. "It's much harder to sell against a poor competitor than a good one. A poor

and was answering questions late into the night. And an eastern foundry sales manager lectures competitors' salesmen on better selling in order to raise industry standards. In Philadelphia, a foundry is receiving favorable customer response from a four-page design and engineering bulletin it publishes five times a year.

Use Trade Group—Larger foundries have had marketing programs for years. But smaller foundries—which comprise the great majority—have too-limited staffs to carry a real program.

Filling in for the small foundries are the trade associations. The Malleable Iron Founders' Society has been holding national marketing seminars and regional sales engineering clinics for eight years.

Marketing Tools — The Steel Founders Society has just completed two major market studies for its members. It sponsors annual design contests and is scheduling 15 regional marketing meetings this year.

The biggest foundry trade group, the Gray Iron Founders Society, jumped in with both feet over a year ago when it appointed the first full time marketing director in the foundry field.

Once they get underway with their new-found sales weapons, the foundries undeniably will have a story of great impact to tell.

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one soon goes broke. Then there's another one to follow him."

Mr. Brown and other Hunt-Spiller salesmen give talks regularly to castings designers as well as to other foundry salesmen at local association meetings. The company also brings in product engineers from customer companies for briefing sessions. It was a revelation to foundrymen, Mr. Brown said, how little engineers realize what can be accomplished with castings. In many cases, their concept of functional design was little beyond academic.

Roving Designers, Film Prove Useful

▪ At least 20 pct of the castings produced at Superior Steel and Malleable Castings Co. in Benton Harbor, Mich. are designed by the foundry's own engineers. Another 20 pct are worked out in cooperation with customers.

The firm's five designers spend two or three days a month on the road with salesmen, working with customers. Superior is another company that has its own plane to speed customer service.

Another innovation: Available to customers is a 16 mm color-sound movie showing the development of a casting.

Design Seminar Is Popular

▪ A one-day seminar sponsored by Banner Iron Works, St. Louis, drew 79 information-hungry castings designers from as far away as Pennsylvania and Texas.

"It was by far the best merchandising effort we've ever pulled off," said Walter Illig, executive vice president.

It was strictly a design forum with no heavy sales pitch. But he feels the seminar is a major factor in current order placing.

Company Plane Lifts Castings Sales

▪ One company which is going in for castings merchandising in a big way is Dalton Foundries, Warsaw, Ind. This firm's salesmen and engineers will take off in the company plane at the drop of a hat to see prospects. They also fly major customers to the plant for consultation.

Even quality control has its uses as a sales tool at Dalton. New patterns coming in are checked thoroughly. Where a re-design is indicated, the customer is informed. The company hopes this service will help boost gray iron castings sales 21 pct over last year.

Dalton salesmen figure it takes up to four years of doing business before they get loose in the shop to see machine operators and engineers. But it pays off. Endorsement by machine shop supervisors can sometimes be the best way of selling castings.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th St., Philadelphia 39, Pa.

VIOLENCE: Robert Hubsham, left, Helen Canfield and William Munley were questioned by Senate racket probers about Teamster-connected bombings and beatings in Scranton, Pa. Unions are behind the eightball.

Organized Labor Is on the Spot

But Don't Look for Easier Bargaining

Senate probe will force top-to-bottom cleanup in the House of Labor.

But don't misread the signs. Labor's bargaining power will be as potent as before.

Look for better union financial controls, more frequent elections.—By Tom Campbell.

IRON AGE'S editor-in-chief Tom Campbell went to government, management and labor to get this composite picture. It is a practical distillation of blunt thinking on all sides of this vital question.

■ No question about it. It was a poor time for the Senate to rake up union corruption, a poor time for organized labor, that is. Before the show is over everyone in the United States will be acutely aware of the dirty linen in some national and local unions.

Labor chiefs are running fast and hard to beat Congress in laying down new ground rules. Reasons for the upheaval in organized labor circles run deeper than it looks on the surface. Some managements are misreading the probable outcome. They are expecting a result that is far from certain: A relaxation in labor's demands and a drop in wage costs.

Where Will It End?—It is not yet clear how far Congress, the Administration or the liberal rank and file will go in the current housecleaning. Missteps by any of those three—or by management—could produce a closing of the ranks among the average rank and file, the creation of labor martyrs and a backing and filling among politicians. But let's analyze the situation.

To get an insight into what is happening, remember that the union man or woman is also Mr. and Mrs. Consumer. For the past four years the average person has been repeatedly saying "no" at local option elections where the deal is to spend the taxpayer's money. The avalanche of letters to Washington indicates that the same people want less national spending. The disclosures of the loose spending by teamster moguls Beck and Hoffa—and the many more choice bits yet to come—are bringing the same hue and cry from the same people against misspent union money.

There is every reason to believe that George Meany, AFL-CIO head, will force a housecleaning from top to bottom—or make it so hot for those who don't that

Because of Senate Labor Hearings—

LOOK FOR:	DON'T LOOK FOR:
Placation of union rank and file.	**Change in labor militancy.**
More frequent union elections.	**Smaller wage demands.**
Laws covering pension funds.	**Split in labor ranks.**
Demands for audited annual reports by unions.	**Fall-off in members.**
Closer control over union leaders.	**Sweet reasonableness.**
End to extravagant union spending.	**Too restrictive controls.**
Deeper sense of responsibility to the public.	**The clock to turn back.**
Cleaner labor house top to bottom.	**Politicians to become too brave.**
	End of labor problems.

suspension will be in order. It is clear too that Walter Reuther, auto union head, will as usual turn the labor hearing liabilities into assets. Dave McDonald, Steelworkers head, is running scared since his tough competition at his last election. He will be tending to his knitting in no uncertain terms. (THE IRON AGE, Feb. 28, '57, p 35.)

Management Reaction—Some industrialists, are quietly happy that organized labor is having its comeuppance. That is a natural feeling among those who have had the short end of the stick for so many years. Other management teams feel that this is the turning point in labor's power: Now is the time to give the screws a turn.

But there is a big segment of management in the larger companies which is not so sure that the current labor troubles will beat down the massiveness, the militancy, and the monoply of labor. They are moving into the question cautiously—not at all publicly. Also, this section of management is a little confused about rank and file thinking. Following the recent steelworkers election where an unknown received a tremendous ballot ovation, some steel leaders were nonplussed at the results. The strong showing against Dave McDonald was grass roots stuff, the strength of which had not been anticipated.

Behind Steel Revolt—High level industrial relations people are not yet sure if the revolt in the steelworkers was due to a general "pocket book" angle involving the dues hiking or whether it was a real revolt against the present leadership. Outside observers—including this reporter — believe the basic reason for the heavy anti-McDonald vote was predominantly the man-on-the-street resentment against free wheel spending of union funds and the bite of higher dues.

There is a good reason why management is divided on what will happen to labor's future as the result of the Senate hearings. The rank and file and the "good" leaders in organized labor are for anything that will protect them and the union from individualistic free wheelers such as Hoffa, Beck, et al. That is the trend now and the Senate hearings have made it the "thing to do and say."

Don't Overdo It — But hardbitten labor relations men in industry know the rank and filers are a fickle crowd if they think they are being pilloried by company "bosses." Much of the talk today about management and labor being genial and breaking bread at the table with mutual problems and solutions makes good copy but it doesn't tell the whole story. The demarcation line between management and labor is just as clear and final as it ever was—if you are using the right kind of glasses. If workers get the idea that management is encouraging them to fight their unions on grounds other than their own protection, look out.

So management that thinks the drive for ending profligate spending, and high handed dues decisions is the big support behind the hearings is not jumping to any conclusions yet. It may later. But one thing this group believes: Over-enthusiasm on the part of management about the beating organized labor is taking could act as a boomerang.

Don't Relax—A large segment of management in recent weeks has come to the conclusion that while eventually there will be controls over unions which are not now present and while the "rascals will be turned out" of labor's house none of this will affect bargaining.

As long as industry faces a labor shortage in skilled, white collar and professional help there is no chance that labor will drop in price. High sounding as "labor" might be it is still controlled by the law of supply and demand. It's a mistake to believe that today's labor hearings will make it any easier for you at your next bargaining hassle.

A Prediction—The people, the rank and filers, Congress and escapades of stupid labor leaders are well on their way to writing a new chapter in organized labor history. And it will read: Better control financially, more public light on union activities, less open handed high level money tossers (and keepers). And in the end labor will tread the same path as once did management until it reaches the point where its business is everyone's business—everyday.

If too many management people "get into the act" they may blunt the wholesome drive that already appears to have generated a tremendous momentum.

SEN. KEFAUVER: Steel is a main target.

ROGER BLOUGH: His speech is an issue.

Who'll Probe Steelmakers First?

Sen. Kefauver and Rep. Patman head up committees now leveling their respective sights on steel industry pricing.

Some observers call it a double play for publicity, with first move getting biggest press.

■ It's an odds-on bet that steel executives will be called before at least one Congressional committee in the months ahead to bare their corporate souls.

And there's an even chance they'll be in the hot seat before a pair of committees.

Both Hurry—The Senate antitrust subcommittee, headed by Sen. Estes Kefauver (D., Tenn.), and the Senate-House Economic Committee are in a race to see which one sets up a probe of the steel industry first. Sen. Kefauver's group may win.

The antitrust unit has been talking for some months of an investigation of what it terms "administered price" industries. An administered price industry is one in which prices are set, held constant for some time, and sales fluctuate at that price, says the subcommittee.

For Publicity—There are complaints that the probe, if it comes off, will be mostly a hunting expedition. "They'll kick over all the rocks they can find and see what crawls out," one Washington businessman complains.

Sen. Kefauver, in a recent speech, listed steel, newsprint, many types of food, automobiles, and farm machinery, in that order, as main targets. In the same speech he sharply criticized statements of U. S. Steel Board Chairman Roger M. Blough that future development may call for bigger organizations.

Census Report—A tip off on the tack the inquiry will take may lie in the results of a study the subcommittee has ordered from the U. S. Census Bureau on the "size of concentration." This will show, the Senator says, the extent of concentration by industry and by product.

One of the principal directors of the antitrust subcommittee probe is John Blair. Mr. Blair, on leave from the Federal Trade Commission, is an economist who first entered the spotlight during the economic investigations of the 1940's of the Congressional Temporary National Economic Committee (TNEC).

Old Probe — The TNEC probe was aimed at showing that some federal controls over prices, corporate size, and a federal business license system was needed.

As the subcommittee digs around in the fiscal records of "administered price" industries, it will attempt to uncover evidence that in some industries prices are "quasi-monopolistic" and set by implicit agreements.

Latest Probe — The probe will also attempt to show that the Eisenhower Administration's tax and military procurement policies have "fostered the growth and strength" of administered pricing.

The joint Economic Committee's probe will be similar, although probably better based, if it is held. This group, headed by Rep. Wright Patman (D., Tex.), has been collecting evidence for almost two years.

Steel price increases, due after July 1, will give the two committees a ready-made hitching rack on which to tie their investigations. But the threat of the probes won't stop the increases. "The industry is not going to swallow its costs just to make life pleasant for a bunch of politicians," a spokesman said.

Imports Threaten Wire Market

U. S. Producers Hunt New Markets

Low cost imports of foreign wire products have U. S. producers worried about the future.

Selling quality and service against lower prices can't do the whole job.

Some mills are diversifying, or developing new products for new markets.

■ What may be needed is a Monroe Doctrine for merchant wire products. Foreign wire is establishing new beach-heads in the North American market this spring, and doing it with the easy dispatch of a Marine Raider Battalion.

Barbed wire and nails are hardest hit, but wire rope is receiving increasing attention from foreign producers, and Japanese baling wire is coming in at an increasing rate.

Debate Quality—Commented one wire mill official, "It's treason to say it, but some of these Japanese nails aren't bad stuff." Opinions vary. Other sellers point out that barbed wire has been brought in that has subgrade galvanized coatings, it is of lighter gage than specified, and in shorter coils than the domestic product. A 12 and 14 gage, high tensile barbed wire is coming in from Germany this spring that is proving a potent sales weapon, none the less.

Quality or no, Japanese nails are coming in at $25 to $30 per ton under U. S. prices. Barbed wire is coming in at $30 per ton under U. S. domestic pricing.

Moves Inland—German and Belgium barbed and baling wire are shipping successfully and in the teeth of Japanese competition to West Coast points, and German wire has sold competitively as far inland as Minneapolis. Despite efforts by U. S. producers to sell quality, packaging, and account servicing of their product, it's generally conceded that foreign wire will again capture a growing slice of wire products sales in the U. S.—probably its biggest slice to date.

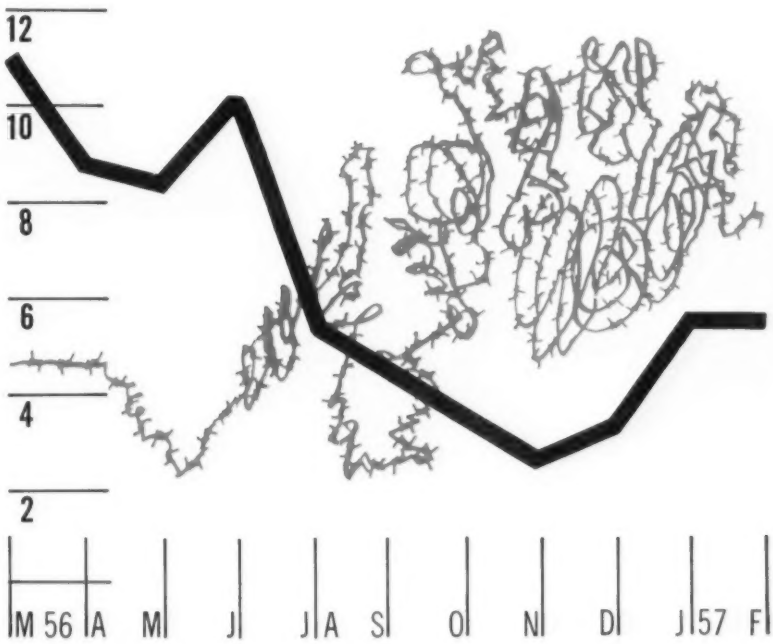
Coupled with a slowing in domestic demand for wire products generally, the impact of cheap foreign wire has pushed U. S. shipments of barbed wire to less than 65 pct of year ago levels. Drawn wire, major item in the wire products group, is little affected by foreign imports and currently is running at about 15 pct below last year's shipping levels. American-produced baling wire has held even better, was only 10 pct below year-ago levels in the opening months of 1957. But there is trouble ahead.

Product Rundown—Despite the early strength shown by baling wire this year, wiremen agree that drawn wire remains the major hope for domestic producers of wire products in the five wire types listed by the AISI. Nails and staples, barbed and barbless twisted, bale ties, and even woven wire fence, had their best post World War II years in the 1950-52 period. Bale ties and barbed wire actually hit their peak even earlier, in the 1947-48 seasons. None have returned to those peaks.

Barbed wire was hit soonest and hardest. Imports rose from an estimated 26,000 tons in 1953 to 60,000 tons in 1954 to 75,000 tons in 1956. Domestic production fell from 163,000 ton in 1953 to 136,-

How Imports Hurt Barbed Wire Market

Shipments in thousands of Net Tons.



FIGHTING BACK: Wire mills in the U. S. aren't quitting in the face of foreign competition. Some, like Republic Steel, are expanding their facilities. Selling quality and service helps hold the line somewhat.

000 tons in 1954 to 74,000 tons in 1956. Nails weren't hit as hard. Exports have gone from 93,000 tons in 1954 to 114,000 tons in 1956.

U. S. nail production hit 570,000 tons in '54, rose in 1955, then fell back in 1956 to 558,000 tons. Wire rope and strand imports rose from 3900 tons in 1954 to 9700 in '56. Wire rope and strand competition is of later date than the barbed wire problem, but there are danger signs. U. S. production went up by 20 pct in the 1954-55 period. Imports rose by 40 pct, and went up an estimated 76 pct again in 1956.

Where It Hurts—Long-term statistics fail to show the sharp slash in domestic barbed wire and nail and bale tie business. Wire tonnages shipped in the 1946-56 period have advanced an average of 4.6 pct per year, or an average annual tonnage increase of 130,000 tons per year. But only because drawn wire has been advancing at a 5.7 pct average annual rate.

Nails are falling, but still average out at a 1.5 pct gain per year. Barbed wire has already gone over the hill, to the extent that the 10-year average is already depressed to a 7.7 pct tonnage loss per year. Since 1953 the drop has amounted to 25 pct per year.

What's Being Done—The U. S. wire mills are certainly not sinking beneath the waves. In drawn wire they are holding their market and expanding with it. Republic is installing 15 wire drawing machines at Chicago this year and is carrying the fight to the enemy with the installation of 22 nail machines. Another producer will spend a quarter of a million dollars on new nail equipment.

Continental will have more wire drawing capacity by mid-May as part of a 3-year expansion program. Northwestern has attacked the problem by diversifying, has begun rolling plate to 24 in. width and will roll light structurals later this year. Colorado Fuel & Iron has also hit product diversification hard, has more demands for its new products than it has steel to roll. American Steel & Wire has upped paving mesh capacity sharply over the past two years, while modernizing existing wire facilities.

Paving Mesh Looks Good—Paving mesh is of major importance in the wire industry push for diversification. Virtually no wire mill does not have plans that include paving mesh. It's often hush-hush, nobody is eager to let the competition know how much, but everybody is expanding mesh facilities. A development that will bear watching is the advent of secondary producers, who will buy machines and weld mesh from purchased stock.

The diversification payoff was already apparent in 1956, though somewhat obscured by the steel price increases. Wire product shipments fell 8.5 pct. Northwestern's net went from $51 million to $74 million; Keystone Steel from $62 million in 1955 to $66 million in '56; Continental advanced from $44 million in '55 to $46 million in '56; CF&I jumped a spectacular $84 million. Last week some wire mills still operated at 100 pct of capacity.

But the fact remains. U. S. production of nails, baling wire, and barbed wire will be cut again this year by cheap foreign wire.

Import Curb Sought

Legislation to restrict imports of foreign iron and steel wood screws is pending before Congress.

The proposed legislation, introduced to the Senate by Sen. Everett Dirksen, R., Ill., and in the House by Rep. Noah Mason, R., Ill., would limit imports of wood screws in any year to 10 pct of domestic production the previous year.

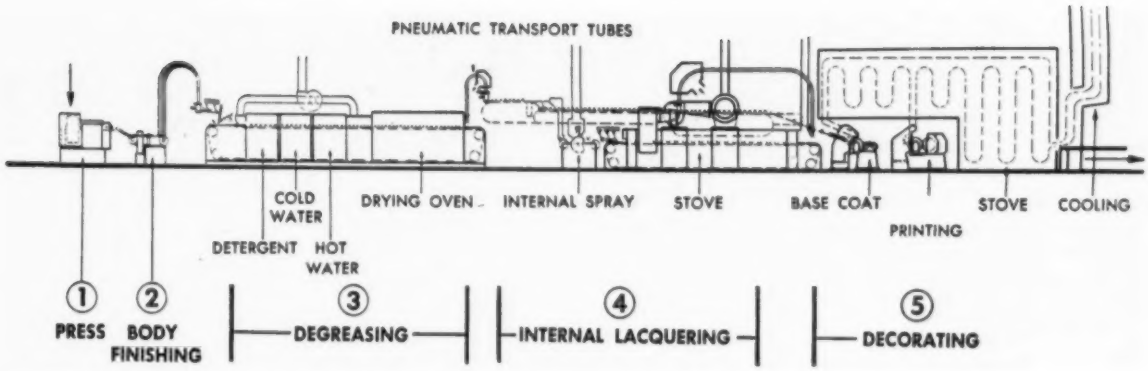
Heavy importations of iron and steel wood screws have reached the point where the American industry is "jeopardized and action is called for," Sen. Dirksen says.

The bill would permit the U. S. Tariff Commission to set quotas.

Canadian Steel

Production of steel ingots and castings in Canada reached 424,112 net tons in February. This compares with 467,505 tons in January and 400,638 tons for February, 1955.

For the first two months of this year, production totaled 891,617 net tons, including 869,875 tons of steel ingots and 21,742 tons of steel castings.



SCHEMATIC: Aluminum slug goes in and seamless can comes out, with no manual steps in between.

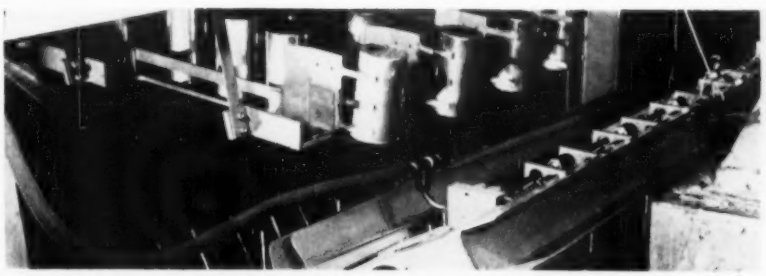
Automatic Aluminum Can Line

▪ Aluminum is one lap closer in its quest for a bigger chunk of the can market.

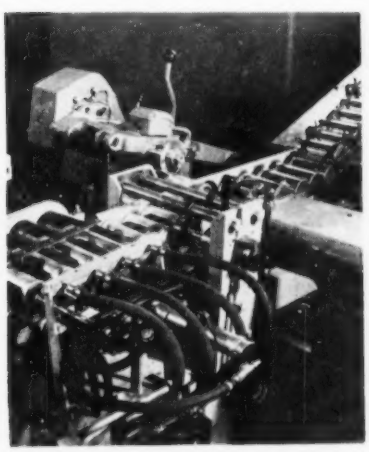
Aluminium Ltd., Canadian primary producer, reports its German subsidiary, Aluminiumwerke Goettingen, has successfully set up what it calls the world's first completely automatic aluminum can production line.

A series of machines, from impact extrusion press to offset printing press, are tied together with pneumatic tubes. The result: Seamless, rigid aluminum cans produced without manual assistance, from slug to coated and printed finished product.

Even more important, Aluminium Ltd. says, these cans are being sold at prices comparable to cans of tin and black plate, under European conditions.



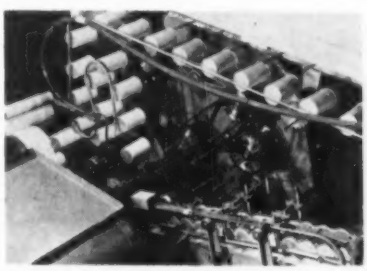
TRANSFERS: Completely automatic equipment shifts cans, in batches of four, to moving spindles which will carry them to the degreasing unit.



TRIMMING: Cans are gravity-fed to an automatic machine for trimming flanging and forming of base.

Equipment—In addition to the presses, the line, called "AC can line" contains: (1) body finishing machines which trim to length, flange, or bead and modify the base when needed, (2) continuous degreasing machine and drying oven, and (3) machine for internal lacquering, and accompanying storing oven.

The equipment will make cans from two to three inches in diameter, from two to six inches in height. The line is set up so that, in particular cases, steps can be bypassed when they are not required. For instance, a small can used for coffee is not internally lacquered. A conveyor carries this can past that station, with no intricate adjustments required.



PRINTING: Base coat is applied as first step of printing. Next step is storing oven for thorough drying.

CANS: Cans from the "AC Line" are already used—to package beer, coffee, oil, and other products.

Let Students Meet Your Firm

Possible Payoff: Good Tech Workers

When Selas Corp. moved to the suburbs it decided to be a really good neighbor.

And the efforts, while helping the community, may benefit the company as much or more.

Take, for example, the program providing tours, books and part-time work for the area's high school students.

▪ "There are many ways," says Frederic O. Hess, president of Selas Corp. of America, "in which even a medium sized or small engineering or manufacturing concern can help solve the problem of the shortage of engineers and scientists, and other technically trained people, on a local basis, right in its own community."

And Selas—a heat and fluid processing engineering firm employing about 580 people—practices what it preaches in the community surrounding its new Dresher, Pa., plant.

Four Part Drive—Since moving in a little over a year ago Selas has:

Taken part in a cooperative high school-industry plan in which students spend part of their day working in the firm's laboratory.

Aided the start of a science library in nearby Upper Dublin High School with a gift of technical books last year and another this spring.

Cooperated in providing tours of the Selas laboratory and plant for high school students studying economics.

Set up a plan offering summer employment for high school teachers of science and mathematics and for engineering students.

So far three students have taken part in the combined high school-industry plan. Both they and the company are enthused about the program.

INSPECTION: High school economics students get close-up of industry as they examine furnace in Selas plant. Later company officials will visit them in their classroom to discuss the company in fuller detail.

DIRECTION: Research Technician Sam Cordua (left) guides student Joseph Zenobio in assembling experimental fluid processing equipment. Next year student work will probably be counted as a regular school grade.

The Best There Is—"It's ideas like this," says Sam Cordua, group leader of the Selas research technicians, "which will really help us solve our national worries about developing technical personnel. Whether or not these kids go on to become engineers they're more valuable to themselves and industry because of this on-the-job training—the best experience in the world."

"I never knew I could learn so much in three weeks," reports Joe Zenobio, one of the students taking part.

"I'm looking forward to returning again in the fall," says Robert Chaeff, another trainee who's still a junior in high school.

At present each student works at the Selas lab four hours a day for three weeks. Then another takes his place. However, next year the training period may be extended to ten weeks.

Seeing is Believing—In the tour program, Selas is cooperating with ACES (Americans for the Competitive Enterprise System), a citizen's group formed to demonstrate, through economic education, the superiority of our competitive system over collective forms.

A Multipress case study

MULTIPRESS® ends rejects of plastic toy assemblies for Lionel

ASSEMBLING plastic and powdered metal toys with mechanical presses resulted in excessive scrap losses at Lionel Corporation. Then Multipress tackled the job, and rejects were a forgotten profit-taker.

With Denison's hydraulic Multipress, the ram stroke adapts itself automatically to variations in material thickness, delivers only the exact pressures required. No more loose assemblies because of inadequate ram pressure; no more fractured parts caused by excessive pressure.

Lionel also found that workers prefer the quiet, safe hydraulic operation of the Multipress . . . and lost time in tooling changes and maintenance has been cut to a minimum.

Let a Multipress expert show you how to improve your production methods . . . cut costs. Write Denison Engineering Division, American Brake Shoe Co., 1242 Dublin Road, Columbus 16, Ohio.

Rejects have been cut to a minimum by using Multipress for staking these miniature assemblies at Lionel Corp.

HYDRAULIC PRESSES • PUMPS • MOTORS • CONTROLS

Fabricators Forecast Record Year

Construction order backlogs still grow. And new structural capacity has been added.

Answer is a record year for fabricators of structural steel.

▪ Pausing to catch their breath after first quarter, structural steel fabricators are predicting new highs for 1957. Earlier predictions of 4,050,000 tons of bookings and estimates of 3,800,000 tons in shipments are now considered conservative. Fabricators, says American Institute of Steel Construction, point to several major factors to bolster their optimistic forecasts.

Among the most important is substantially higher structural capacity and output by steel producers as a result of expansion and modernization programs. Structural shipments by the mills last year set a new record of 5,360,000 tons despite the steel strike shutdown. And this record was above the 1955 figure of 4,736,987 tons. Shipments this year, AISC figures, will be at least 15 pct above the 1956 figure.

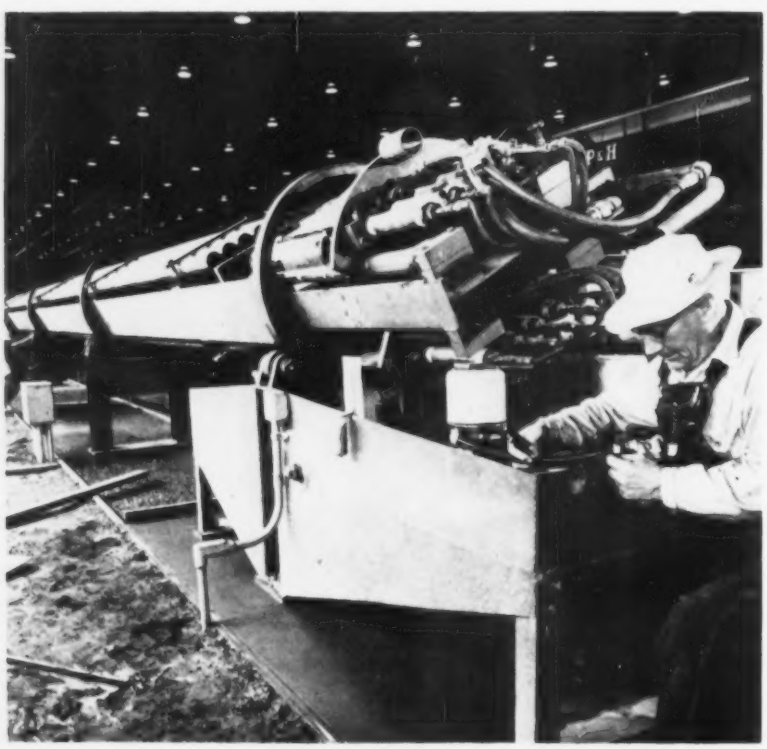
More Capacity—Total structural capacity gains will total 1 million tons by the middle of this year. Nearly 90 pct of this increase will be in wide flange beams. By 1959, combined total expansion of plate and structural shapes will have reached over 1.5 million tons, and by 1960, 2.5 mlilion tons of capacity will have been added.

Second major brace to the fabricators' optimism is continued high level of heavy construction and heavy backlogs. At end of first quarter this year, total heavy construction backlog was about $106 billion, a gain of 9 pct over the corresponding 1956 figure. As of Mar. 31, highway and building construction work in the active planning stage each showed gains of about 12 pct over the 1956 levels for the same date.

Can Take More—Fabricating shops report they could handle still more work if the steel were available and if design and detailing could be done faster. Shortage of engineers is as serious in this industry as in others. But actual shop facilities are not strained.

Meanwhile, despite declining sales in several lines, the cost of building materials and of construction costs continue to rise.

TAKES FIVE: New, 36,000-lb quintuple-die copper tube draw bench, below, will turn out five tubes, each 125 ft long, in a single draw. Annual capacity of this new American Brass plant, Paramount, Calif., will be 30 million lb of tube, sheet, strip, rod and wire.



Ore Process Company

Republic Steel Corp. and National Lead Co. have formed the R-N Company for the development of direct reduction of iron ores.

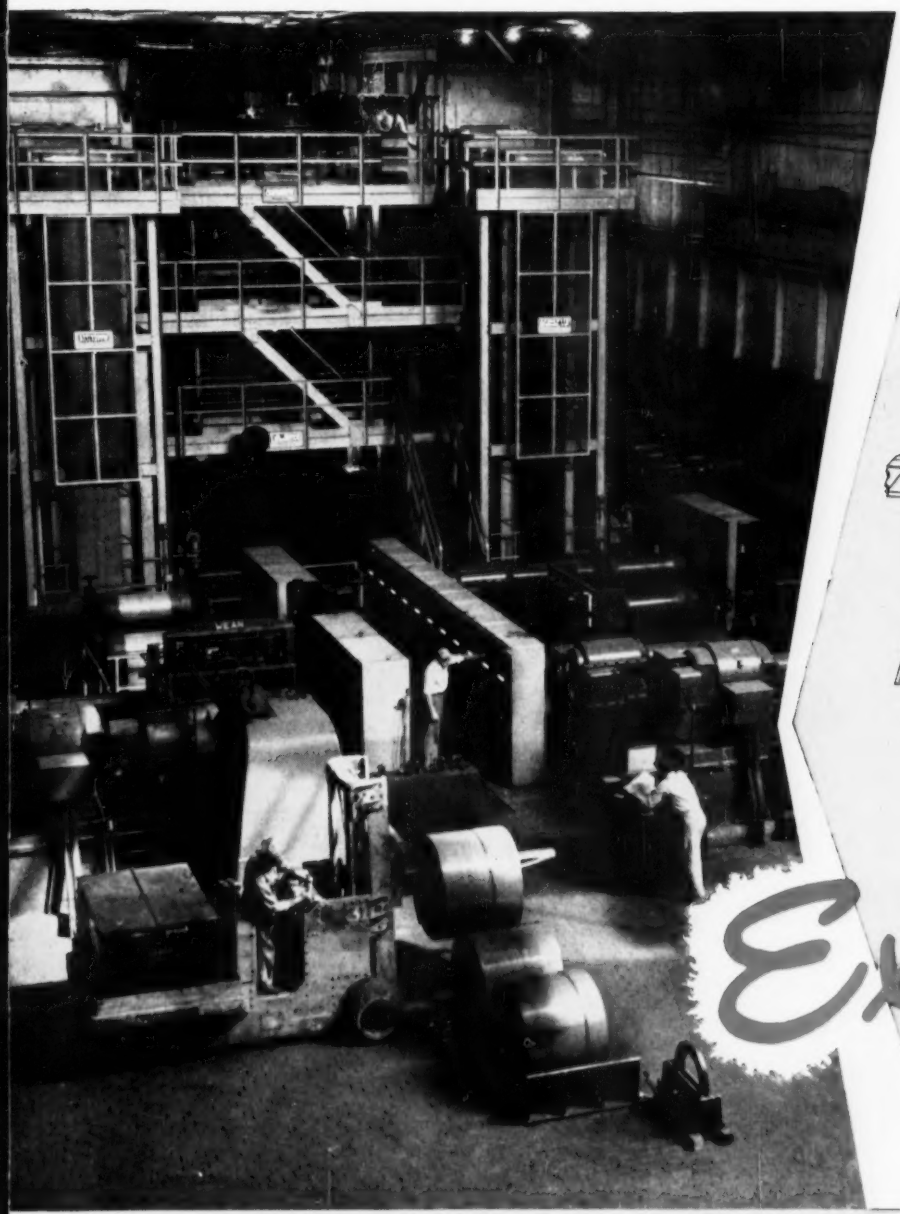
The new organization, owned jointly by the two companies, has developed a process for the treatment of both low and high grade iron ores. It provides high metallic iron feed materials for use in blast furnaces, electric, openhearth and cupola furnaces.

The R-N process was originally devised by National Lead in course of research and development work on the separation of iron and titanium from titaniferous ores.

Cerro Expands

Cerro de Pasco Corp. has broken ground for a $3 million electrical tubing plant. The facility will be built by Circle Wire & Cable Corp., wholly-owned subsidiary, at the site of the Hicksville copper-rolling and steel-flattening plant.

WEAN CONTINUOUS STRIP ANNEALING LINES



WHEN *Experience* COUNTS

Two of five Wean Continuous Strip Annealing Lines installed in a Pittsburgh district mill.

Ninth Wean Engineered Line Sets New Record

The ninth Wean designed continuous strip annealing line for silicon and tinplate products is now in the process of construction. This means that Wean has engineered more of these lines than all other firms combined — a record in every sense of the word.

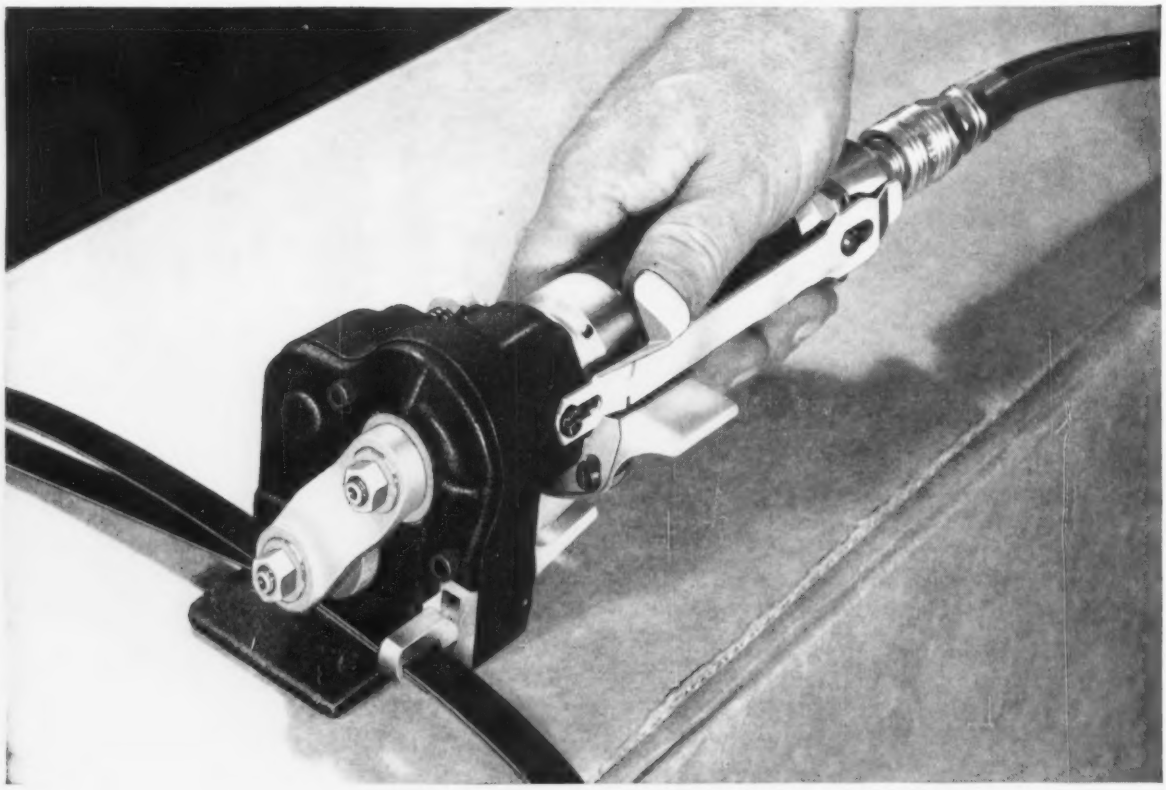
The reasons for this Wean leadership are many. For example, the Wean design permits maximum speed and production while providing an excellent bright annealed product of uniform surface. And, users of Wean continuous lines report better metallurgical control, better temper mill operation with elimination of stickers, better delivery and a reduction in process inventory.

★ Wean also has designed and built 11 Stainless Steel Continuous Annealing Lines — also a record in the industry.

58

THE WEAN ENGINEERING COMPANY, INC. WARREN, OHIO

Another Plus . . . from Brainard



PROGRESS: A better tensional stretcher to speed up your strapping operation

For complete information on the PNE Stretcher or any one of those 378 items mentioned above, write . . .

This new air-powered PNE Stretcher brings "production line" efficiency to packaging applications using any size of tensional strapping. It provides unlimited take up at predetermined tensions. Thus operator fatigue is reduced and tensioning errors are considerably lessened. A PNE Stretcher is available for every tensional width, and each tool adjusts to all gauges in the width it handles.

A continuing program of improvement and development of strapping materials and equipment is an established policy with Brainard. For example, the Brainard strapping line includes over 378 items to provide you with the finest available modern strapping facilities. A Brainard-trained Sales Engineer is on call in every major city to help develop maximum efficiency in your strapping operation.

Brainard Steel Strapping

SHARONSTEEL

Brainard Steel Division, Sharon Steel Corporation
Griswold Street, Warren, Ohio

221

Sydney G. Thornbury

Filling Gaps in Metal Surfaces

The treating of metal surfaces is a wide field that is constantly changing.

This Los Angeles chemist is doing a big job keeping abreast of metal-working technology.

He calls his work "surface chemistry," a science unto itself.

S. G. Thornbury: Each technological achievement poses new problems.

▪ For a man who feels he is just a beginner every time he steps into a laboratory, Sydney G. Thornbury, president of Turco Products, Inc., has an enviable record.

For 30 years he has been applying chemicals to metals, coming up with such firsts as water-rinseable carbon and paint removers, a water-soluble petroleum solvent, and other metal surface cleaners. He has done much to advance techniques in chemical shaping of metals, decarburizing, anti-scale coatings and many more.

Never Stops Learning—"No one, in a final sense, ever learns this business," says Mr. Thornbury, "but he may, and must, go on learning indefinitely. After 30 years . . . we are still beginners."

As the saying goes, a man who finally realizes how little he knows is on his way to becoming an authority. The adage was applicable to Mr. Thornbury three decades ago.

Watch For New Products — In 1927, fresh out of the University of California at Los Angeles, he collaborated with two brothers-in-law to form Turco Products. He headed the technical department, which consisted of himself. Perhaps his "each day is a new challenge" approach is a big reason why the company has grown from a $3000 investment to a multi-million dollar international corporation.

Throughout his career, Mr. Thornbury has never strayed far from the lab. In spite of the pressures of administrative duties, he has weekly sessions with the technical group to develop new products.

"Part of the fascination of this business . . . is that each new achievement of technology poses a new problem for us," he points out.

Service Is Vital — A new paint for metals means new problems in surface preparation; new metals in jet engines mean problems in removal of carbon and oxides. To succeed, a service business such as Turco must be useful in helping a customer to keep production going smoothly, Mr. Thornbury says. "Often, we know more about a customer's production problems than he knows himself."

While the challenge of industrial chemistry has inspired Syd Thornbury to balance untried chemical equations, he has done some inspiring himself. To viewers of the Ozzie and Harriet Nelson television program, he is inspiration for the character "Thorny," the next door neighbor. He is the Nelson's next door neighbor in real life.

For your protection when you want GRAPH-MO® tool steel remember...

THERE IS ONLY ONE GRAPH-MO TOOL STEEL and it is made *only* by the Timken Company. Graph-Mo is a registered trade-mark owned by The Timken Roller Bearing Company covering our own graphitic type oil-hardening alloy tool steel.

GRAPH-MO IS THE ORIGINAL OIL-HARDENING GRAPHITIC TOOL STEEL. Graph-Mo is a metallurgical development of The Timken Roller Bearing Company, who developed and promoted the graphitic type tool steels.

GRAPH-MO TOOL STEEL IS AVAILABLE ONLY through the authorized tool steel distributors of The Timken Roller Bearing Company.

MAKERS of quality dies, gages, punches and machine parts rely upon the Graph-Mo® trade-mark to insure the quality and economy needed for their parts. We're proud of that confidence. We prize Graph-Mo's reputation. The trade-mark Graph-Mo helps us protect this reputation. That trade-mark protects *you*, too. Here's why:

The trade-mark Graph-Mo identifies the most stable, machinable and wearable of all tool steels. By specifying Graph-Mo, the original graphitic tool steel, you can always be sure of these advantages and the high quality you've come to expect from Timken fine alloy steels.

To be sure you get Graph-Mo, always specify it by name. And remember it is available only through authorized distributors of the Timken Company. For more information about it or our other specially developed graphitic tool steels, send for the new 10th edition of "Timken Graphitic Steel Data Book". Write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO". Tapered Roller Bearings, Alloy Steel and Seamless Tubing, Removable Rock Bits.

TIMKEN *Fine Alloy* **STEEL**

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING

Heat Is Off Consumer Credit

You haven't heard much lately on consumer credit. There's a good reason.

There's no real demand for tightening installment credit. There may be plenty of urging to ease it.

▪ You will still hear some faint mutterings about the dangers of too much consumer credit. But it is unlikely that there will be any serious attempt to tighten it further.

If anything, if the current business leveling should become a marked decline, there will be plenty of pressure to ease the terms of installment buying.

Tight Credit Arguments—Some economists and financial authorities put up strong arguments that too much consumer credit is an important, if not the major, inflationary factor. They contend that under-saving and over-spending are the dangerous trends.

But the temper of the hard money crowd has eased considerably. Just as has the hue and cry to "get" William McChesney Martin, Jr. and the tight money policies of the Federal Reserve Board.

Leveling Off—For one thing, the rate of climb in consumer credit has leveled off. Part of this is because of tight money policies. Equally significant is the reaction from the over-extension of installment credit in the auto buying boom of 1955.

Even the auto people, who thought that the 1955 rate of buying could continue forever, now realize that to a great extent they were selling credit, not cars, in 1955. Too many would-be buyers are still paying off their 1955 models.

Not Guilty—Total installment is still increasing, but not dangerously more than consumer income or gross national product. Furthermore, the government's own credit policies are easing. Even the Federal Reserve Board's own study of consumer credit points no strongly accusing finger at consumer credit as a factor creating economic instability.

Don't Wait for a Recession

Levels Still Hold—The game of looking for recession signs continues. But they are still few and far between compared with business indicators that hold at near-record levels.

The Federal Reserve Board reports in so many words: "Economic activity, incomes and wholesale prices in March and early April generally changed little, remaining at or above earlier record levels."

More Ups Than Downs — The Board's summary of business conditions shows few signs that would lead to a pessimistic outlook. Minerals production reached a new high, but over-all manufacturing continued unchanged.

Steel production is down, from a year ago, but it's interesting to note that activity in most major steel consuming industries is at or above the level of a year ago.

Appliances Down — During March, aircraft, railroad equipment, shipbuilding, and farm implement manufacturing all picked up. Output of industrial and commercial machinery and electrical equipment continued at peak rates, all well above a year ago.

On the less bright side, auto output continued down in March and April. Production of appliances is well below a year ago.

Home Building Up, But How Far?

Less Than 1 Million—It's apparent that non-residential construction will have to fill the gap left by the decline in new home building.

Indications are that housing starts will now run well under a million units this year. This is below what is considered healthy for the building and construction industry. Fortunately, there is no decline indicated in plans of business and government to build new plants.

Housing starts in March totaled 83,000 units. Even though this is a 28 pct increase over February, it was the lowest March total for any year since 1949. This is a seasonally adjusted rate of 880,000. January rate was 1,010,000, February 910,000.

By comparison, there were 1,118,100 nonfarm dwelling units started in 1956. This was 16 pct behind 1955. Sharpest cutbacks were in metropolitan areas, down 20 pct, compared with only a 4 pct decline in non-metropolitan areas.

S-P Gains in Comeback Drive

Planning a New Economy Car in 1958

After steadily losing money, Studebaker-Packard may be back in the black.

Big profit hopes lie ahead in foreign car deal and economy car production.—By T. L. Carry.

▪ The auto industry's spotlight has been shining so brightly on American Motors Corp. lately that reporters have been inclined to neglect the present condition of the industry's other independent producer, Studebaker-Packard Corp.

Since Curtiss-Wright Corp. took over management of S-P last year, the company has been attempting to make a comeback in the industry. And it has not been doing a bad job. Immediate objective under C-W's management was to cut costs to the bone and thereby realize some sort of a profit.

In the Black—Although Studebaker-Packard lost over $43 million last year, it did show a profit of $895,000 for the last 2 months of 1956. First quarter results were not available at press time, but Harold E. Churchill, S-P president, says the firm will show a small profit this year.

One of S-P's biggest problems since its management arrangements with Curtiss-Wright has been distribution. In short, the problem was and still is how to hang onto dealers who no longer are able to cover the luxury car market with the Packard Patrician and Four Hundred. The answer may be the granting of franchises to S-P dealers for the sale of a luxury foreign car, the Mercedes-Benz.

Setting Terms — It has been known for some time that Curtiss-Wright has been negotiating an agreement with Daimler-Benz A. G. of Germany. Under the terms, C-W will be able to handle the sale of Mercedes-Benz in this country. In addition, a new American company, Curtiss-Wright & Mercedes-Benz, Inc., has been set up for the sale of Diesel engines.

In exchange, Curtiss-Wright is giving Daimler-Benz the right to produce aircraft engines and allied equipment in Germany.

The important part of the agreement as far as Studebaker-Packard is concerned is the franchise for Mercedes-Benz.

Skeptics Are Willing — Altogether, the car is produced in 19 different models. They range in price from approximately $3500 to $13,000. The higher priced models are equipped with fuel injection systems.

Some Studebaker-Packard dealers are uncertain about the prospects of selling the car. They frankly admit that they don't know if former Packard owners will be willing to

Behind Studebaker-Packard Strategy

▪ When Curtiss-Wright Corp. took over management of S-P last year, Roy T. Hurley, C-W president and board chairman, was no newcomer to the automotive field. He was a Ford Motor Co. executive before joining C-W eight years ago. He is known for his hard-driving, economy-minded tactics.

At his side is Harold E. Churchill, S-P president. An engineer turned administrator, his 30-year automotive career has been with the Studebaker organization. He holds more than 50 patents; is recognized as a top-notch technical man. Curtiss-Wright named him S-P president when it took over.

Roy T. Hurley

Harold E. Churchill

Prehistoric monster?

No. You're looking at the *world's largest dredger* . . . a hungry man-made monster of a machine that can move a mountain of earth in a day.

Imagine the brute power it takes to move this behemoth—even more, the joint-strength it needs to hang together despite the strains and stresses it undergoes! It typifies what's been happening in the earthmoving equipment field. They're making them bigger, more powerful, more rugged.

What helps hold such hard-working equipment together?

Plenty of standard *nuts and bolts.* They have to be strong and flawless, these fasteners . . . completely reliable.

RB&W—A MAJOR AND RELIABLE SUPPLIER

A leader for 111 years, RB&W turns out the finest quality fasteners possible—for the heavy equipment field as for so many other major fields in industry. *Modern facilities, new techniques, long experience* . . . all combine to make RB&W fasteners truly the "strong point of any assembly".

CONTACT THE RB&W "FASTENER MAN"

Proper application of standard fasteners can save you money. Ask the RB&W "Fastener Man" to show you how. Contact your nearest RB&W office.

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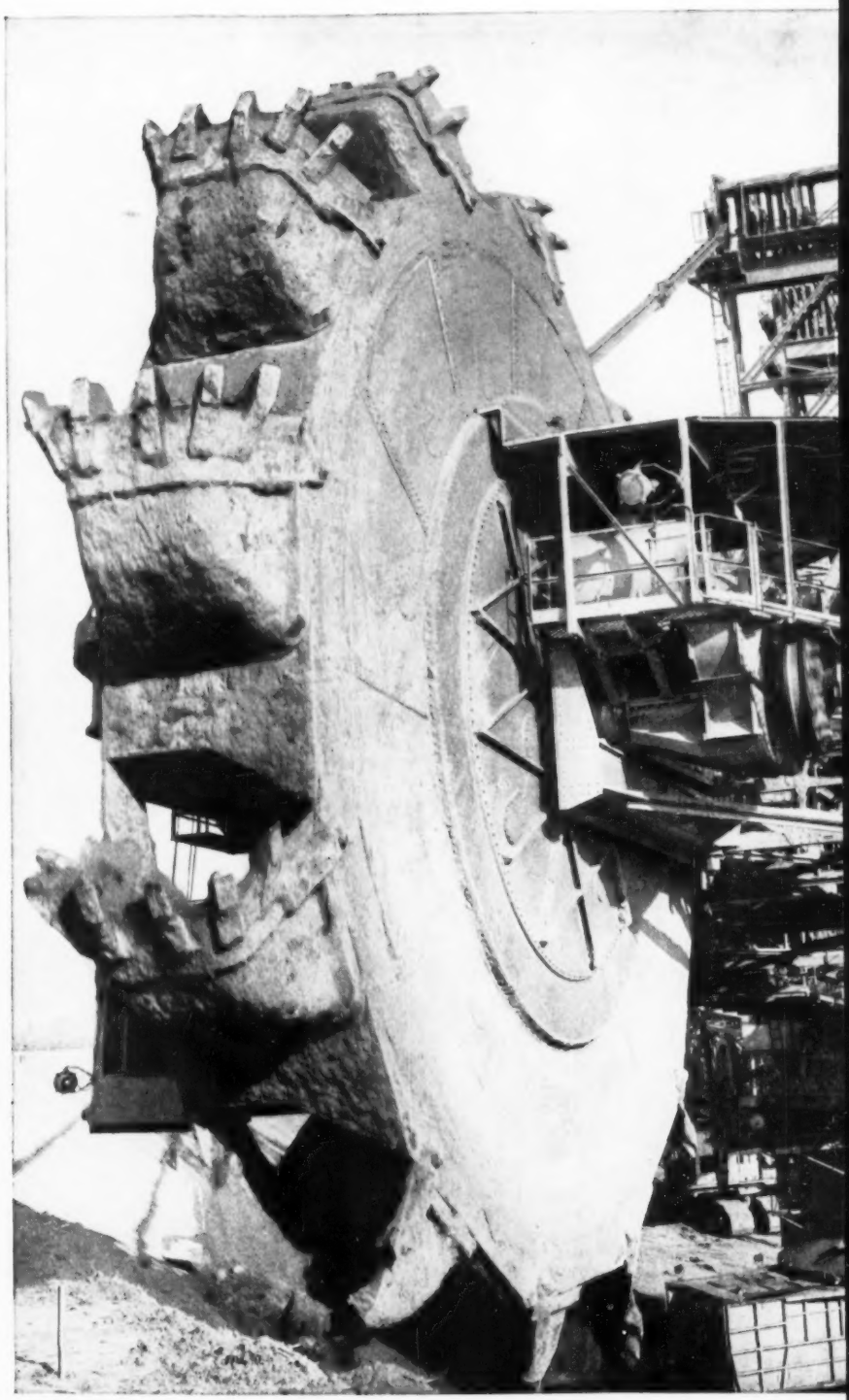

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This 8½ ton crankshaft—nearly a flat car long—is a typical everyday product of Titusville Forge. Whether your forging requirements are large or small—complex or plain shafts, cylinders or heavy wall tube—look to Titusville Forge to be sure.

WRITE for Forging Bulletin illustrating recent products and facilities.

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MACHINERY DIVISION

MACHINERY for Sheet and Structural Metal Forming . . . Tangent Benders . . . Folding Machines . . . Roller Table and Tumble Die Bending Machines . . . Press Brakes . . . Punching and Notching Machines . . . Forming Dies

Automotive Production

WEEK ENDING	CARS	TRUCKS
April 20, 1957*	121,465	23,475
April 13, 1957	126,194	22,704
April 21, 1956	129,826	23,337
April 14, 1956	135,918	24,242
TO DATE 1957	2,169,465	346,419
TO DATE 1956	2,141,902	385,693

*Estimated. Source: *Ward's Reports*

buy a Mercedes-Benz. But the dealers are willing to take the chance because of other plans that Studebaker-Packard has for its products.

Economy Car Coming—In addition to the foreign cars, the company plans to introduce next year a new line of economy cars including a two-door sedan that will sell for less than $1800. Two other models in the economy line will include a 4-door sedan and a station wagon. S-P emphasizes that the under $1800 car will not be a stripped down model. The price will include a heater, defroster and turn signals.

In addition, the company has no plans to discontinue its present Packard models, although they are at present only highly styled Studebakers. In fact, S-P will bring out a new Packard model in 1958. This car, according to insiders, will be something like the present Studebaker Hawk, which is a sports car.

Thus, the company's plans have been set. In short, they are to cut costs, keep dealers happy by offering them a broader line of products and thereby show some kind of profit this year.

Truck Designs Change

More and more truck producers are starting to take advantage of the opportunity the federal road building program offers.

Building roads requires the use of vehicles that can operate with ease both on and off the road. Such equipment calls for trucks that have heavier rear axles for bigger loads and 4-wheel drives.

For Rough Driving—Chevrolet is the latest producer to come out with a line of 4-wheel drive trucks. The GM division is presently in production of 12 models at its Willow Run, Mich., plant. The vehicles are designed for specialized truck uses where conditions make operation of normal 2-wheel drive trucks almost impossible.

Power is supplied to the wheels through a 4-speed transmission. When the vehicle is in the 4-wheel drive position the power is divided between the front and rear wheels through a 2-speed transfer case.

Each front wheel is attached to a constant-velocity universal joint at the axle.

Brake Heat Problems Hound Engineers

Heat dissipation is still the number one problem in the design of automotive brakes despite the recent advancements that have been made in both the quality of brake linings and materials used for the brake drums.

When brakes are applied to an automobile, the friction builds up a tremendous amount of heat. This in turn causes the brake drums to expand and at the same time has an adverse effect on the lining.

Cause of Failure—After a series of panic stops at 70 mph, a car's brakes usually fade. The heat generated has completely distorted the brake lining.

This is an extreme condition and is not likely to occur during normal driving, although it could happen if a driver applies light pressure to the brake pedal during the long descent of a steep hill.

Some Use Aluminum—The introduction of 14-in. wheels on some cars this year has increased the heat problem for brake engineers. The braking area is smaller but the heat generated is just as large.

Thus, engineers have turned to aluminum for brake drum materials because the metal dissipates heat quicker. Some manufacturers now offer brake drums with aluminum fins that allow air to circulate more freely within the drum.

Buick Makes Tests—But the problem still remains. Buick has just established a permanent brake testing station within the city of Los Angeles. The GM division has laid out a route within the city that covers 196 miles.

THE BULL OF THE WOODS By J. R. Williams

HAH! YOU DYED YOUR HAIR, HAH? WELL, WELL, WELL!
HE AIN'T GOT A BIT OF TACT! TH' OTHERS ALL SAW IT, TOO, BUT WERE SMART ENOUGH TO NOT LET ON THEY NOTICED IT!
THAT MAKES THEM LOOK STUPID AN' MAKES HIM LOOK SMART AND WIDE-AWAKE ENOUGH TO NOTICE IT! WHERE TH' TACT COMES IN IS THAT WELL, WELL WELL--IT DON'T MEAN A THING!
4-24 J.R.WILLIAMS
THE SMART GUY

Here's your SUPER-MARKET for tool room grinding wheels

Norton makes wheels for every tool room job . . . precision-built for "TOUCH of GOLD" uniformity

"Everything under one roof" is the modern super-market advantage you get with Norton wheels — the world's largest line, with exactly the right wheel for every tool room grinding job you do.

Norton wheels are precision processed to duplicate wheel balance and structure with precise uniformity.

To you, this means wheel after wheel and lot after lot will grind alike — with the same time-and-money-saving "Touch of Gold" performance.

And remember: only Norton offers you such long experience in both grinding wheels and grinding machines to help you produce more at lower cost. For aid in wheel selection and helpful booklets on tool room operations, see your Norton Distributor. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone directory, yellow pages. Behr-Manning Company, Troy, N. Y., division of Norton Company. *Export:* Norton Behr-Manning Overseas Incorporated. **For the booklets or other information write to Norton Company, Worcester 6, Massachusetts.**

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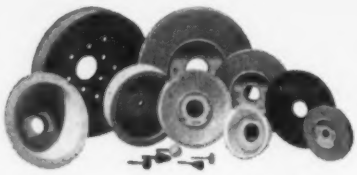
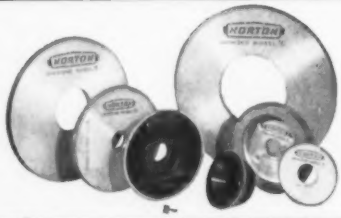
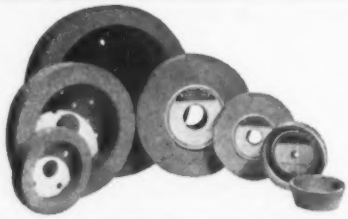


NORTON G BOND AND BE BOND WHEELS bring you the most efficient vitrified bonds ever developed for precision and semi-precision grinding. For sharpening and for surface, cylindrical and internal grinding on all steels and cast alloys use G Bond or BE Bond Wheels in 32 ALUNDUM*, 38 ALUNDUM, 19 ALUNDUM, or the new non-premium priced 44 ALUNDUM abrasive.



NORTON DIAMOND WHEELS for carbide grinding are backed by long leadership in diamond wheel development and manufacture. The regular B resinoid bond is ideal for wet grinding — the B6 resinoid bond for dry grinding.



NORTON K BOND WHEELS IN CRYSTOLON* abrasive are often the best investment for many carbide grinding jobs. The vitrified K Bond comes in half-grade increments of hardness, enabling you to "pin-point" your specifications.

BOOKLETS THAT TELL YOU ALL. *A Handbook on Tool Room Grinding* is over 200 pages long and crammed with facts it will help you to know. *How To Select Wheels For Precision Grinding Tool And Constructional Steels* shows the way to correct wheel selection. Get these from your Norton Distributor or write to the nearest District Office of Norton Company, Worcester 6, Massachusetts.

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

Labor Hopes to Hold the Line

Hearings Hurt Washington Offensive

Organized labor had big plans to get favorable labor legislation passed in Congress.

Now, the attitude is changing. Beck's Senate appearance set back labor's plans.

Outside Washington, labor was hurt most in the anti-labor South—By G. H. Baker.

■ Labor leaders are gravely worried over the prospect that Congress may write some tough new laws designed to clip their wings.

Their attitude of deep concern is a far cry from the ebullient confidence they displayed last winter. At that time there was much rejoicing over the election of a Democratic majority in the Senate and House. Communiques from labor headquarters spoke glowingly of new opportunities to abolish Taft-Hartley and to increase minimum wages. (Only John L. Lewis predicted gloomily that labor could expect little from the new Congress.)

Hold the Line — Today, labor leaders in Washington and their friends in Congress are filled with dismay at the recent turn of events. They frankly realize that anti-labor feeling is rising. They are more concerned now with trying to stop any further erosion of public confidence in union leaders.

The April issue of "Steel Labor" (official publication of the AFL-CIO United Steel Workers) says in a grim dispatch that the rough weather now being encountered by unions is going to last for a long time. And there is still a great danger that the enemies of organized labor will take advantage of the situation to get in some hard blows—"many below the belt."

"The result of the headlines and the sensational stories will be to put all of organized labor under a cloud with a large part of the general public," the USW says regretfully.

Sore at Beck—The great majority of labor leaders are hopping mad at Dave Beck. Their public blasts against him are not faked.

In addition to smearing the entire labor movement, Beck also has knocked the pins out from under two major union drives that had been scheduled for this year and next: (1) An intense organizing drive in the South, still largely nonunion; (2) A frontal attack on nonunion white-collar workers.

Drives Postponed—As a result of the disclosures of Beck's manipulations, both of these important projects are necessarily postponed.

Southern employers, traditionally hostile to labor organizers, are now in a stronger position to resist organizing propaganda.

Congress Plugs Flood Insurance Leaks

Flood Season Here—Congress is fidgeting because no federal flood insurance is on sale to business and residential property owners.

More than eight months have passed since President Eisenhower signed the law permitting this coverage. In some areas, the spring floods have hit or are imminent, and still no government insurance that would cover the damage is available.

Money Problems—There's some feeling on Capitol Hill that not all the blame attaches to the Federal Flood Indemnity Administration. The FFIA asks Congress for $50 million in current funds to get the program operating. Until the money is in hand, the agency insists, it can't take on any obligations by selling policies.

Yet, Congress is in no hurry to grant the money. The House Appropriations Committee has postponed until after April 28 any action on the request. And the FFIA estimates the funds will not be forthcoming before about June 1.

Who'll Buy—A debatable point at this time is the amount of interest shown by potential buyers.

One issue the FFIA has clarified is that of rates. Some property is to carry a rate as high as $12 per $100 valuation. This will apply only on such high-risk property as piers, and other waterfront holdings.

Rate Schedules—Most classes of risks will carry a rate of $1 to $2.50 a $100, provided the owner will coinsure 80 pct of the property. Otherwise, the net rate, excluding the government subsidy of 40 pct, is going to run higher than $2.50.

Provisions for both 50 pct and 80 pct coinsurance will be written into the industrial and commercial policies. Householders' policies will provide for 80 pct coinsurance, at the option of the owners.

Automatic casting of Aluminum *now practical*

with *New* LINDBERG-FISHER Autoladle

We call it "LITTLE JOE"

To the best of our knowledge the Autoladle is the first practical automatic aluminum ladling unit yet divised. Thoroughly tested and proven in service, the Autoladle is adaptable to induction, electric resistance or fuel fired reverberatory furnaces. In any installation it offers these advantages:

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- No interruption of the casting cycle during charging of metal.
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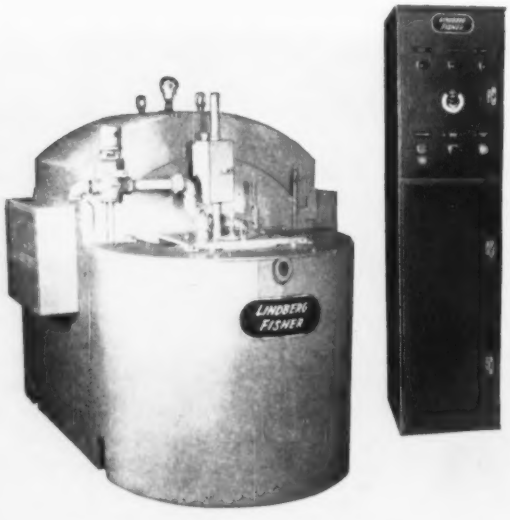
- Composed of special refractory materials so arranged that ladled metal cannot come in contact with any metal.



At the right, "Little Joe" is shown installed in a Lindberg-Fisher electric resistance aluminum holding furnace. With it is the panel cubicle and controls which is supplied completely assembled and wired. For complete information on the Autoladle get in touch with your nearest Lindberg Field Representative (See your classified phone book) or write us direct.

LINDBERG FISHER

A Division of Lindberg Engineering Company, 2452 West Hubbard Street, Chicago 12, Illinois

Construction Will Stay Healthy

Area Doing Better Than Rest of U.S.

Steel suppliers can expect West Coast builders will continue as good customers.

California setting the pace, accounting for $588 million of the $965 million spent in the Far West in January-February.

Sparked by aircraft, missiles, and electronics, industry continues strong—By R. R. Kay.

▪ Metalworking firms with sales charts closely geared to the fortunes of the building industry, can take heart if they do business in the West.

For construction work in this part of the nation is holding up much better than in the rest of the country. And the outlook is for more of the same.

In California, steel suppliers can expect even greater things. Not only is this state slated to lead its neighbors in building this year, but the boom in manufacturing and allied fields promises to soar to higher levels than ever.

Sidewalk Superintendents Busy—Experts made these predictions at the recent San Francisco meeting of the National Industrial Conference Board. Dr. George Kline Smith, vice president and economist, F. W. Dodge Corp., disclosed results of a survey of Western construction contracts that showed:

(1) California now leads all states in building permits.

(2) Western construction has held up better than in the rest of the nation.

For the first two months of this year non-residential construction in the 11 western states ran 16 pct ahead of the same 1956 period. Heavy engineering projects were up 22 pct. Although home building dropped 9 pct, the total was up 6 pct.

In California, non-residential work was 9 pct ahead for the first two months. Heavy engineering projects were up 27 pct and home building down 14 pct.

Best in the West—But the real point for marketers to keep in mind is that California's two-month volume was $588 million out of the $965 million for the 11 western states.

William M. Burke, economist, Bank of America, says there won't be any let-up in the manufacturing pace this year. Industry, sparked by the crucial aircraft, missiles, and electronics fields, will continue strong.

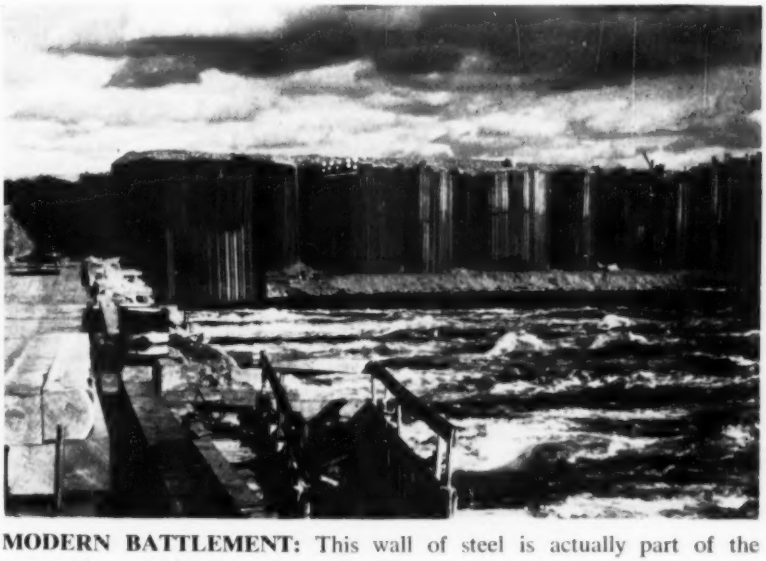
Eliot J. Swan, first vice president, Federal Reserve Bank of San Francisco, agreed: "The year should be a good one with general business activity at high levels."

West Coast Briefs

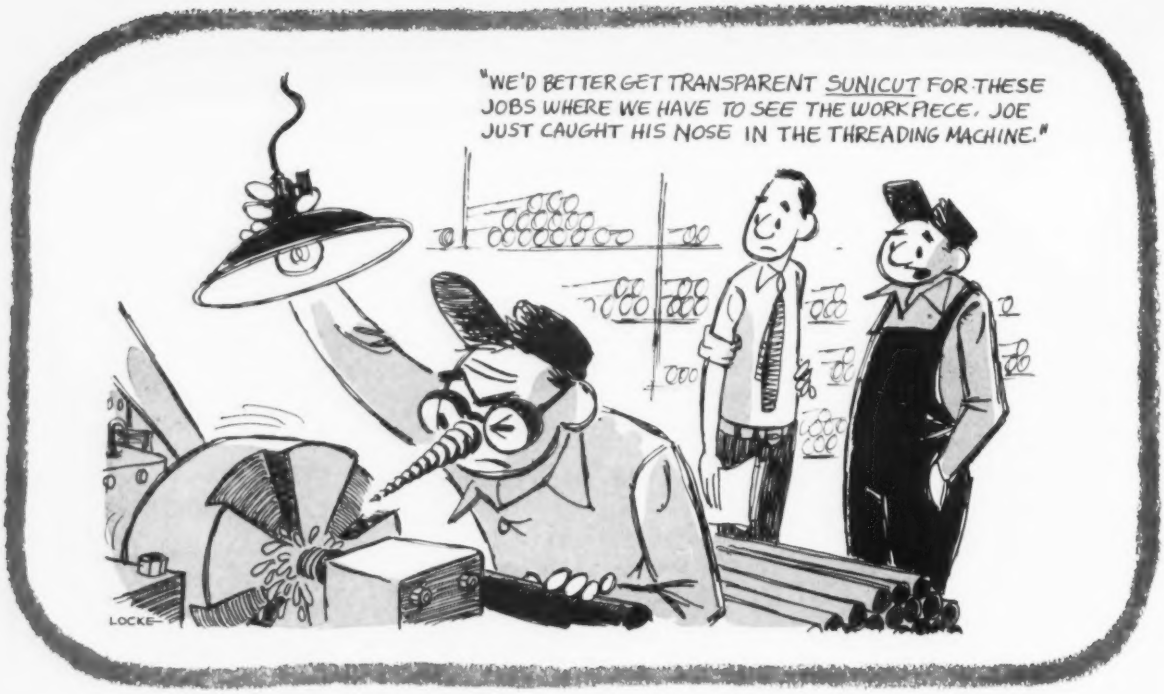
Booming dam construction on the Columbia River is pumping a healthy economic boost into the Pacific Northwest. At the Priest Rapids Dam twenty-three 54-ft diam steel walls are going up on the powerhouse cofferdam.

Bethlehem Pacific Coast Steel Corp., Seattle, is shipping hundreds of tons of steel sheet piling to the site. Other steel companies are also supplying piling for the $92 million project.

Merritt, Chapman and Scott holds the general construction contract.



MODERN BATTLEMENT: This wall of steel is actually part of the twenty-three, 54-ft diam steel cells being erected for the powerhouse cofferdam at Priest Rapids on the Columbia River. Bethlehem Pacific Coast Steel Corp. is one of the firms supplying steel for the project.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LOCKE

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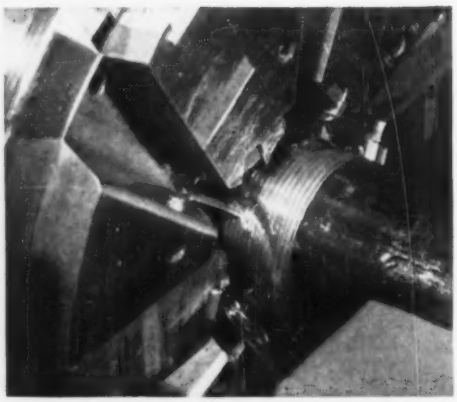

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Automation Must Pay Its Way

Machines Must Be Fast, Economical

The days of automation as mostly a fad are over. Customers won't buy unless they can cut costs.

New machine at Chrysler is called the only means for meeting demand.—By E. J. Egan, Jr.

▪ Time was when installation of some automated machining lines was more a fad than an economy. This is no longer true. Today there must be a clear-cut need to justify the cost of these complex setups.

A 120-ft long transfer machine just installed at Chrysler Corp.'s Airtemp Div., Dayton, O., produces compressors or automobile air conditioners, one every 38 seconds. According to R. J. Schumann,, Airtemp's vice president of manufacturing, the new machine is "the only means by which the company can meet present demands."

More Flexible—The $1 million unit has built-in flexibility, lacking in early automation. It can be used to process two other compressors, for commercial and for packaged residential air conditioners.

The new unit uses 200 individual tool spindles to perform some 60 machining operations. An electrical system containing more than 55 miles of wiring interlocks the all-automatic operations of the 430 hp, 550 amp machine.

Method of Operation—The production cycle starts when compressor castings are placed in an eight-station rotary machine. They are milled, drilled, reamed and tapped, then pass through the 77 stations of the in-line transfer unit for final machining.

As the castings pass along the line, they pause at some stations for multiple spindle heads to perform as many as six different boring or drilling operations simultaneously. Signal lights on a massive console designate each machining station, and indicate when machining at that point is complete.

Quality Control—Eight tool-control boards, on both sides of the transfer machine, provide additional quality-control safeguards. Dial indicators report the relative sharpness of each cutting tool.

All for Automation

A new factory and office building devoted solely to the production of automation machinery has been opened by The Cross Co.

The $6 million plant is located in Fraser, Mich., on the outskirts of Detroit, close to the big automotive automation market.

Milton O. Cross, Jr., company president, says completion of the project gives the company capacity for an annual sales volume of $15 million, and floor space to eventually increase capacity to $25 million.

Output will be stepped up as fast as skilled workers and engineers can be trained with special skills to build automation machinery. Training programs are now in operation.

Among new plant features are: simulated line production, a data processing department with a Univac high speed electronic computer, and an engineering set-up that provides inter-company competition for engineering ideas.

SHORTEST DISTANCE: The new Cross Company plant, Detroit, is set up for straight line operation. Material is received at the front of the plant, moves through the lines, is assembled and shipped at the rear.

INDUSTRIAL BRIEFS

Test Loops—To help speed development of peacetime atomic power, Westinghouse Electric Corp. engineers have placed into operation two experimental "test loops." The units are a system of stainless steel pipes containing a fluid which can be pumped past test specimens. They are designed to aid in the development of new atomic materials, and to supply information for the design and manufacture of atomic power equipment.

Rolling Stock — The Baltimore and Ohio Railroad has ordered 70-ton capacity hopper cars from Bethlehem Steel Co. Cars will be of the open top, drop-bottom type used largely to carry coal, ore and other bulk commodities. A substantial number of the new units will be delivered in the fourth quarter of the year, with the balance scheduled for receipt early in 1958.

Smoothing Rough Spots—To answer the need in many different facets of the abrasive field, a new nation-wide, non-profit, technical and study organization has been formed. It will be known as the American Society for Abrasives. The society plans to organize chapters throughout the country.

Kerns to Coast—The L. R. Kerns Co., Chicago, has opened a wholly-owned subsidiary in Orange, Calif. Known as The Kerns Pacific Corp., it will produce industrial metal processing compounds and specialized chemical products. The new facility is expected to have an annual capacity of approximately 20 million lbs.

Cleveland Administration—Raw Materials, Inc., Pittsburgh, will open offices in Cleveland for the purchase and sale of iron and steel scrap, under the management of Lawrence M. Prescott. Offices will be at 1010 Euclid Bldg., 1006 Euclid Ave., Cleveland, O.

Good Campaigner — Fred J. Bruckner, Los Angeles district manager for the U. S. Steel Supply Div. of U. S. Steel Corp., has been elected president of the Southern California Chapter of the American Steel Warehouse Assn. He succeeds Harold Pearcy, president of Percival Steel And Supply Co., who was named chapter director.

Attention All Sweepers—Fruehauf Trailer Co. and Coleman Engineering Co. have joined forces to produce an airfield vacuum cleaner to solve a jet age landing and take-off problem. The air base cleaner to be known as "Fruehauf Cole-Vac" will be available for military and commercial airports.

Sweet Order—The Cuban Dominican Sales Corp., purchased $1 million in industrial locomotives from General Electric's Locomotive and Car Equipment plant in Erie, Pa. The move was made to modernize its sugar cane transportation system.

Opening of an Era—Era Engineering, Inc. has been formed by a group of aircraft and missile scientists and engineers. Object is to develop new systems and devices in the fields of electronics, radiation and rocketry. Office facilities and laboratories have been located in Santa Monica, Calif.

Ceramic Scholarships — Two undergraduate scholarships in ceramic engineering at the Pennsylvania State University will be given for the fall semester of the 1957—'58 school year. Known as the Vesuvius Crucible Co. Scholarships in Ceramic Technology, the awards will be granted to freshmen entering the University's College of Mineral Industries. Each scholarship provides $500 annually and will be renewed for each of the student's three succeeding years provided academic standards are maintained.

Saturday Nighters, Note — Production of electric-water heaters has been shifted to the Westinghouse Electric Corp. in Columbus from Mansfield, O. The transfer brings to five the number of major appliances produced in Columbus. Capacity at the Columbus plant now is more than 1 million major appliances a year, according to Westinghouse.

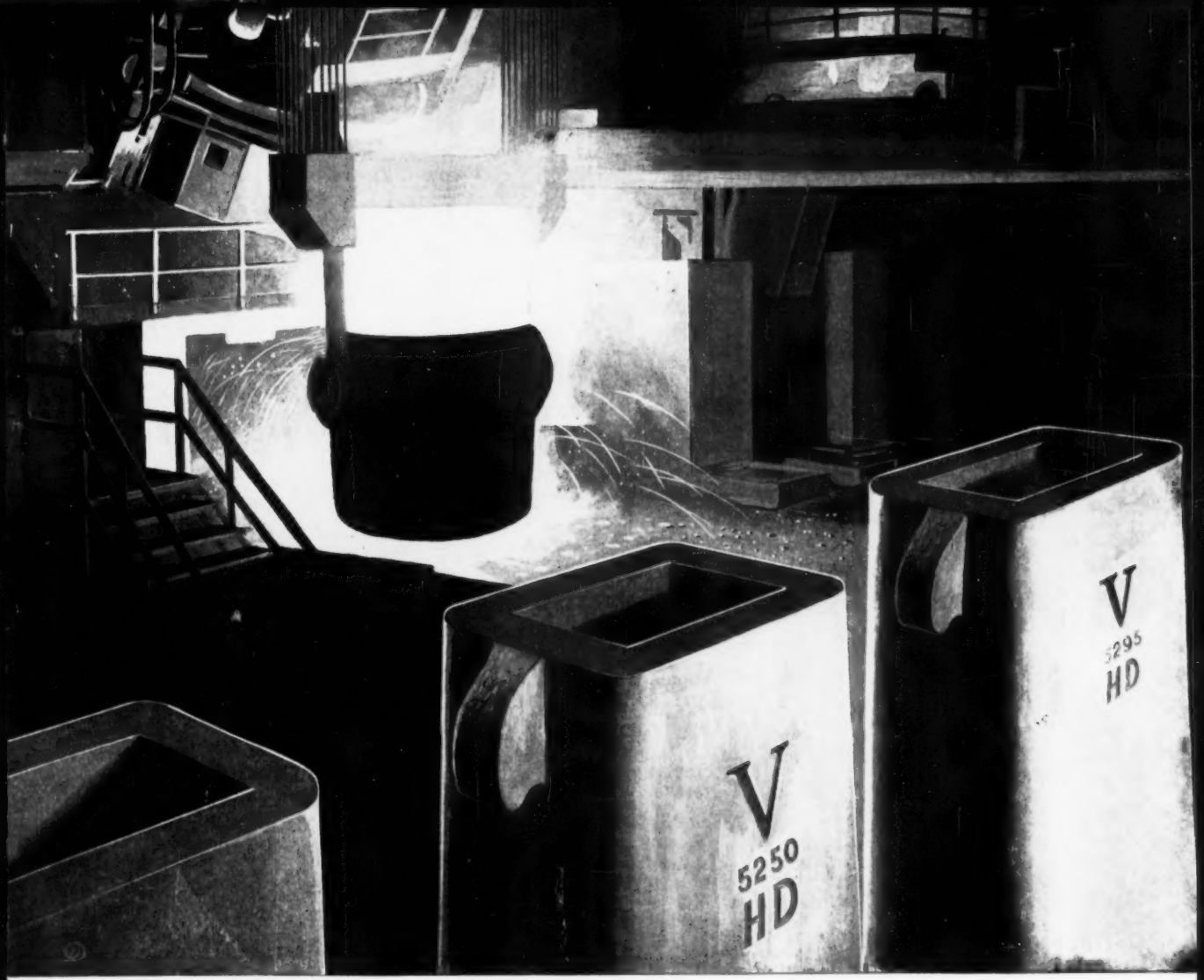
Hot Time At Hicksville—Sylvania-Corning Nuclear Corp. is planning to build a facility at Hicksville, N. Y. to produce atomic fuel elements for reactors used in research and electric power generation. Products of the proposed plant will be primarily fuel elements of a uranium-aluminum alloy.

Richer From Peru—Granite City Steel Co., St. Louis, has purchased a small cargo of iron ore from the Marcona Mining Co. in Peru. Purchase was made to test its efficiency in the company's blast furnaces. The Peruvian ore is a heavy, dense, magnetite. About 59 pct by weight is iron. This is about 7 pct higher than the iron content of the best domestic ores.

Playing to the Gallery—Mine Safety Appliance Co., and Gulf Oil Corp. have hired Gallery Chemical Co., Pittsburgh, for a program of research and production of boron chemicals, including high energy fuels.

Higher Education—U. S. Steel Foundation, Inc., has announced a program of aid-to-education totaling $1.8 million in grants payable to 600 of the nation's privately supported liberal arts colleges, universities, technological institutes and medical schools.

Jaycees' Choice—G. Blair Sheers, president of the Beaver County Manufacturers Assn., and president and general manager of Standard Horse Nail Corp., New Brighton, Pa., has been named Man of the Year by the Upper Beaver Valley Junior Chamber of Commerce.



All ingot moulds by Valley are designed for individual steel plant conditions. These moulds have been proven the highest quality available to the steel producing industry today.

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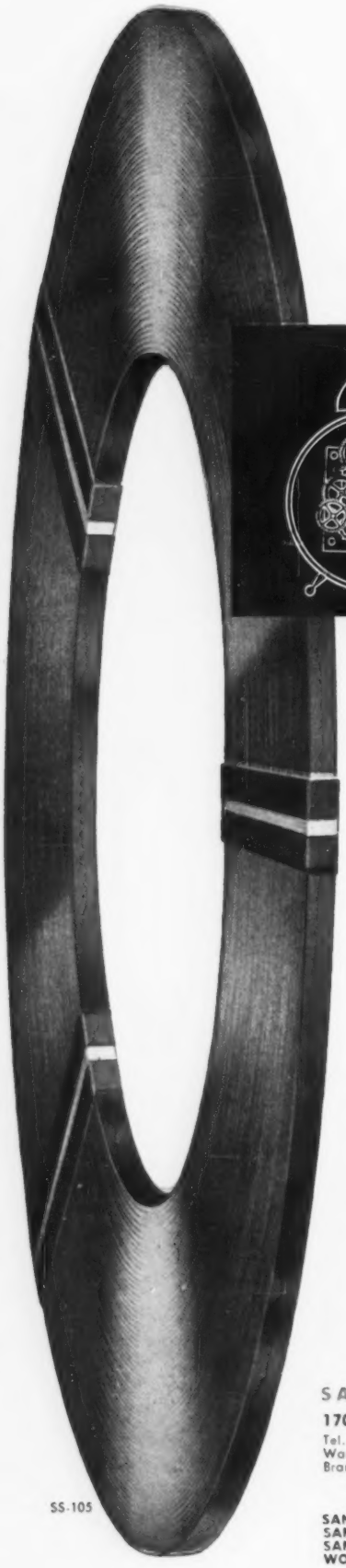

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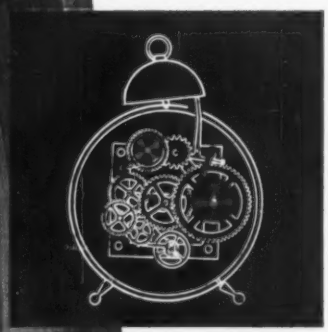

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In products such as clock and watch springs, compressor valves, piston ring springs, vibrator reeds . . . wherever fatigue life is *vital*, you'll find Sandvik untiring in service.

If your product requires high fatigue life, fine surface finish, uniform physical properties and accurate gauge, try Sandvik.

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Leonard Sax, elected president, American Buff Co., Chicago.

Alexander N. McFarlane, elected president, Corn Products Sales Co.

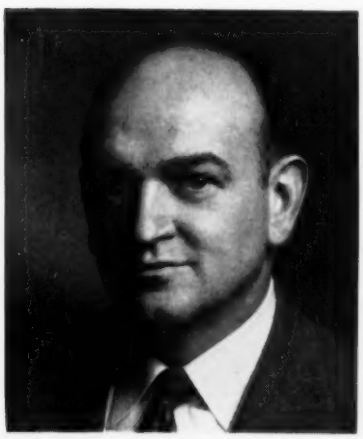
Norman E. Woonton, elected vice president, manufacturing, Cowles Chemical Co., Cleveland.

P. E. Sance, elected executive vice president, Johnson Steel & Wire Co., retains vice presidency of Pittsburgh Steel Co.

W. F. Newbery, elected vice president, industrial sales, Detrex Chemical Industries, Inc.

William G. Troy, named director, purchases, Michigan Seamless Tube Co., South Lyon, Mich.

Joseph R. Carter, elected asst. to the vice president, operations, Pittsburgh Steel Co.



Arthur S. Nippes, elected vice president and general manager, Henry Disston Div., H. K. Porter Co., Inc.

Carl A. Breuer, elected vice president, operations, Pittsburgh Steel Co.

Elmer T. Gustafson, elected vice president and general manager, sales, Ceco Steel Products Corp., Chicago; **George R. Wernisch,** elected vice president, Structural Products Div.

E. Milton Barber, vice chairman, Pittsburgh Steel Co., and executive vice president, Johnson Steel & Wire Co., retires effective July 1.

Donald C. Duvall, elected asst. to president, Pittsburgh Steel Co., retains the vice presidency of industrial relations.

H. Gordon Poole, named research and development consultant, Albany, Oregon, operations, Oregon Metallurgical Corp.

Paul P. Ventura, elected vice president and director, Eastern Heat Treating & Brazing Corp. and Eastern Metals Industries, Inc.

James K. Wingard, named manager, Engineering Press Div., E. W. Bliss Co., Canton, O.

C. D. Nickison, elected president and Lewis C. Laderer, elected vice president and director of sales, Wells Specialty Co., Inc., North Liberty, Ind.

J. A. Gerber, named director, procurement, Pacific Car and Foundry Co., Renton, Washington.

N. M. Reiners, elected vice president, research, Cummins Engine Co., Inc., Columbus, Ind.

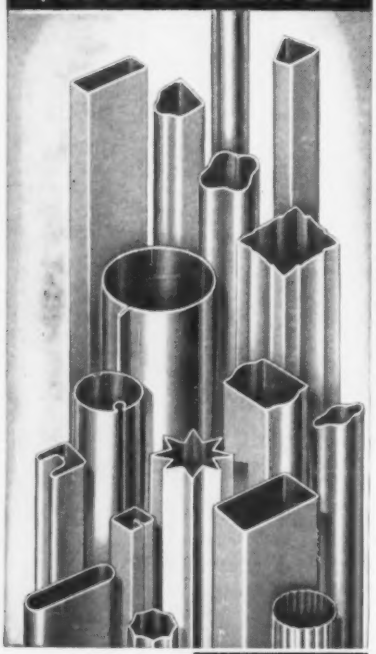
Frank J. Foley, elected vice president, United Screw and Bolt Corp.

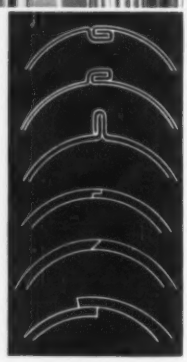
David R. Breien, elected vice president and comptroller, The Lummus Co., New York; **M. J. Marchione,** elected treasurer and **C. Frank Corbin,** named asst. secretary.

David W. Gordon, elected treasurer, The Barden Corp., Danbury, Conn.

McHenry Browne, elected vice president, press sales, R. Hoe & Co., Inc.; **Arthur J. Durante,** elected vice president, press manufacturing; **W. C. Wieking,** named asst. vice president and manager, field engineering; **W. W. Hender-**

COLD ROLL FORMING TUBULAR SHAPES





Among the wide variety of things you can make on a Yoder Cold Roll Forming machine are round, square, oval, rectangular and other tubular shapes, such as illustrated. The seams may be open, lapped, butted, dovetailed, interlocking, etc. – as shown in the drawing.

Millions of feet of such unwelded tubular shapes are made from coiled strip for conductor pipe, bedsteads, lamp stands, window channel, wiring raceways, carrying rods, etc. Production ranges from 20,000 to 50,000 feet per day, with only one operator and a helper.

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YODER COLD-ROLL FORMING MACHINES

son, named asst. vice president, press sales; **R. P. Hollister** and **Arthur Gordon,** named asst. controllers.

Harold D. Prior, named technical director, The Chas. Taylor's Sons Co., subsidiary of National Lead Co., Cincinnati.

William M. Valiant, elected asst. treasurer, Borg-Warner Corp., Chicago.

John L. Bennish, elected secretary and treasurer, Leary & Owens Machinery Co., Birmingham, Ala.

Theodore E. Hart, appointed secretary and treasurer, Alloy Precision Castings Co., Cleveland.

T. M. Hunter, named asst. to vice president, operations, U. S. Steel Corp.

George M. Keen, appointed manager, Sprinkler Dept., Power Piping & Sprinkler Div., Blaw-Knox Co., Pittsburgh.

Frederick E. Ullman, named general manager, engineering, Inland Steel Container Co.

Jay J. Patten, named supervisor, forge shop, Rem-Cru Titanium, Inc., Midland, Pa.

Carl P. Cronk, named director, marketing research, National Electric Products Corp., Pittsburgh.

W. M. Jensen, named general sales manager, Forbes Steel Corp., Canonsburg, Pa.

J. E. Swanson, elected president, Graver Tank & Mfg. Co., Inc., East Chicago.

William V. Cross, named manager, sales development, Ion Exchange Div., National Aluminate Corp., Chicago.

John C. Feick, Jr., named asst. to vice president, Air Conditioning Div., Westinghouse Electric Corp., Staunton, Va.

Gunnard R. Olson, named district manager, Detroit sales office, Revere Copper and Brass Inc., Detroit.

Robert B. Hainey, named manager, manufacturing administration and personnel development, Large Steam Turbine - Generator Dept., General Electric Co., Schenectady, N. Y.

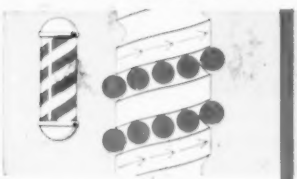
Albert J. Reichers, named plant manager, Aircraft Products Div. and **Richard G. Wall,** named plant

These MODERN Recirculating Ball Units can help you...

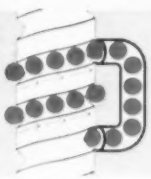
SOLVE ACTUATION and TORQUE PROBLEMS

Saginaw b/b Screws guaranteed 90% efficient —offer 6 major advantages for designers

Available in custom machined and commercial rolled thread types—have been built from 1½ inches to 39½ feet long—⅜ to 10 inches diameter.



Nut glides on steel balls. Like stripes on a barber pole, the balls travel toward end of nut through spiral "tunnel" formed by concave threads in both screw and mating nut.



At end of trip, one or more tubular guides lead balls diagonally back across outside of nut to starting point, forming closed circuit through which balls recirculate.

1 VITAL POWER SAVINGS. With guaranteed efficiency of 90%, Saginaw b/b Screws are up to 5 times as efficient as Acme screws, require only ⅕ as much torque. This permits much smaller motors with far less drain on the electrical system. Circuitry is greatly simplified.

2 SPACE/WEIGHT REDUCTION. Saginaw b/b Screws permit use of smaller motors and gear boxes; eliminate pumps, accumulators and piping required by hydraulics. In addition, Saginaw b/b Screws themselves are smaller and lighter. Units have been engineered from 1½ in. to 39½ ft. in length.

3 PRECISE POSITIONING. Machine-ground Saginaw b/b Screws offer a great advantage over hydraulics or pneumatics because a component can be positioned at a predetermined point with precision. Tolerances on position are held within .0006 in./ft. of travel.

4 TEMPERATURE TOLERANCE. Normal operating range is from −75° to +275° F., but assemblies have been designed in selected materials which function efficiently as high as +900° F. These units are practical where hydraulic fluids have lost efficiency or reached their flash point.

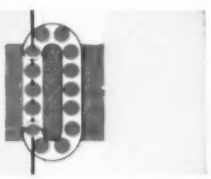
5 LUBRICATION LATITUDE. Even if lubrication fails or cannot originally be provided because of extreme temperatures or other problems, Saginaw b/b Screws will still operate with remarkable efficiency. Saginaw units have been designed, built and qualified for operation without any lubrication.

6 FAIL-SAFE PERFORMANCE. Far less vulnerable than hydraulics. In addition, Saginaw offers three significant advantages over other makes: (1) Gothic arch grooves eliminate dirt sensitivity, increase ball life; (2) yoke deflectors and (3) multiple circuits provide added assurance against operating failure.

Saginaw b/b Splines average 40 times lower friction coefficient than sliding splines

Transmit or restrain high torque loads far more efficiently—have been built from 3 inches to 10 feet long—⅜ inch to 6 inches in diameter.

The Saginaw b/b Spline radically increases the efficiency of transmitting or restraining high torque loads. Instead of sliding against each other, surfaces glide on rolling balls.



The steel balls recirculate in closed circuits formed by mating longitudinal raceways spaced around the circumference of inner and outer splines. Guides return balls.

This revolutionary new kind of spline utilizes the same basic principle pioneered by Saginaw in the ball/bearing screw.

It permits new engineering designs never before practical—literally lets you achieve the "impossible"! In any application where column length must change under torque load, the Saginaw b/b Spline offers greatly decreased friction, less wear, longer life, more dependable operation. It can be fitted with integral gears, clutch dogs, bearing and sprocket seats or a wide choice of other attachments for use with electric, hydraulic or pneumatic units. To convert push-pull to rotary motion, helical types are available with very high leads, ranging from 20:1 to 100:1.

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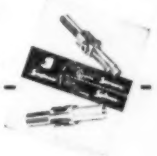

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b/b Screw and Spline Operation
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Saginaw ball bearing Screws and Splines

SAGINAW STEERING GEAR DIVISION OF GENERAL MOTORS

WORLD'S LARGEST PRODUCER OF BALL BEARING SCREWS AND SPLINES

accurately formed
WELDED or WELDLESS
Edgewater rings

save critical materials . . .

reduce costly machining . . .

meet highest quality standards

Your most critical specifications can be met by Edgewater Steel Rings—welded or weldless as required by the service. Formed accurately by modern methods, they are close to finish size as rolled. Weldless rings are rolled from solid steel blocks, in diameters from 5 to 145 inches. Welded rings up to 48 inches in diameter are formed from bars extruded or rolled to shape. Both types can be made in a great variety of sizes and cross-section shapes, as shown below. Being accurate in size and cross-section, Edgewater Rings save costly material and machining time.

Edgewater Steel Company

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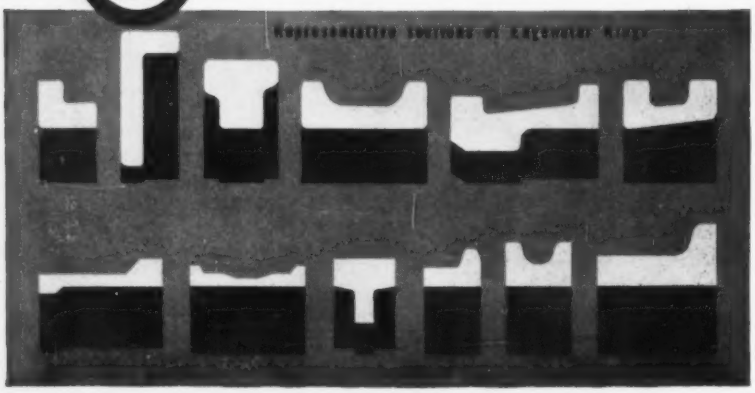


manager, Stainless Engineering & Machine Works Div., Cooper Alloy Corp., Hillside, N. J.

Alan Moyer, named Milwaukee divisional sales manager, industrial sales, Reynolds Metals Co.

Eugene D. Schunke, appointed manager, internal control, Kelite Corp.

Cecil H. Hull, Jr., named manager, marine traffic, Diamond Alkali Co., Cleveland.

E. N. Gosselin, elected chairman of the board, Graver Tank & Mfg. Co., Inc., East Chicago.

John S. Appleyard, named plant manager, Plainville Div., Marlin-Rockwell Corp.

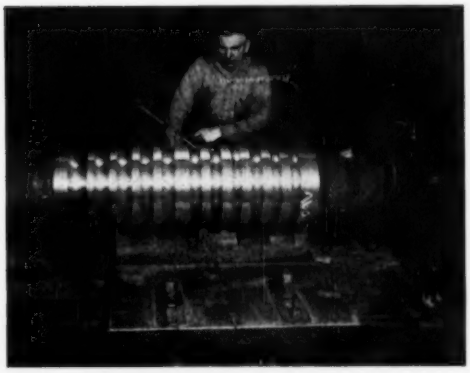
The following appointments are wtihin Central Engineering of The Electric Auto-Lite Co. **Joseph L. Rooney,** named chief engineer, central battery engineering; **John L. Lander,** appointed manager, basic battery research; **Samuel L. Ford,**

TIPS FROM A ROLL MAKER'S NOTEBOOK

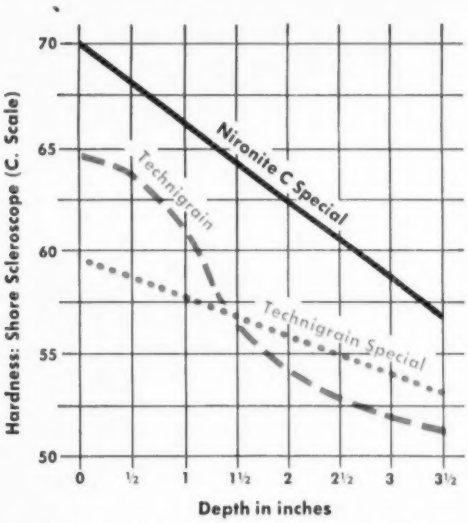
MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

Cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

A merchant mill roll should be just good enough



Easy to turn: Mack-Hemp *Technigrain* and *Technigrain Special* rolls are readily turned and redressed.



Technigrain rolls compare favorably in hardness penetration with more expensive, higher-alloy types, as shown by these generalized curves.

The wise purchaser of merchant mill rolls buys rolls that give him the service life he needs *and no more.*

This is because increased roll service life usually goes hand in hand with higher alloy content and more complex heat treatment. Both add to the price of the rolls. But... most merchant mill operators redress their rolls after each production run. Thus, if a set of rolls is still good for more tonnage before redressing at the end of a run, chances are that the rolls are too good—and therefore too expensive—for the job.

But price is not the only consideration. To be just "right", a merchant mill roll should (1) offer wearing qualities closely related to the length of the production runs for which it is used; (2) have good hardness penetration to provide wear resistance at the bottom of passes; and (3) have grain structure fine enough to assure good finish of the rolled product.

Quality at low price. Mack-Hemp *Technigrain* and *Technigrain* Special rolls offer an inexpensive solution. In fact, *Technigrain* rolls are so generally useful for all merchant shapes that they have virtually eliminated the roll inventory problem for many operators. At a price that averages several cents per pound less than higher-alloy grain rolls, *Technigrain* and *Technigrain Special* provide service life adequate for the vast majority of applications. Available in a hardness range of 55 to 60 Shore (C Scale), they offer good hardness penetration and finely dispersed graphite to provide a smooth work surface. Of course, for unusually severe merchant mill service, Mack-Hemp's *Nironite C Special* offers all of Technigrain's properties, in a higher hardness range.

To sum up, *Technigrain* is the ideal roll for general merchant mill use: it is low in cost, it provides sufficient service between redressings, and it rolls products of better-than-adequate surface finish.

Technigrain is only one of the more than thirty types and hundreds of iron and steel roll analyses produced by Mack-Hemp. For advice and information relating to your specific roll application, why not 'phone or write us today? There's no obligation. Address Mackintosh-Hemphill Division, E. W. Bliss Co., Pittsburgh 3, Pa.

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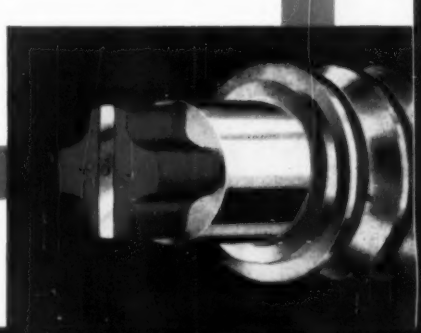

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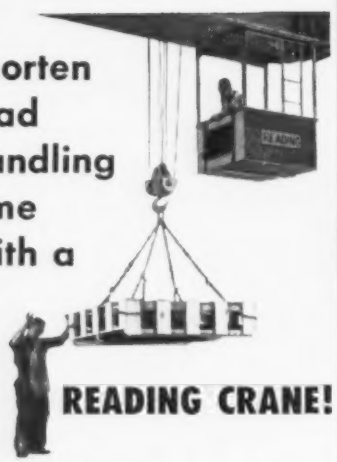
Shorten load handling time with a



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Clarence A. Hubert, named general manager, Construction Equipment Div., International Harvester Co., Chicago.

Clarence H. Mingle, named director, marketing, The Gates Rubber Co., Denver, Colo.

V. C. Hawksley, named branch manager, Philadelphia warehouse, Atkins Saw Div., Borg-Warner Corp.

Henry Larsen, appointed asst. general works manager, Tractor Group, Allis-Chalmers Mfg. Co., Milwaukee.

Robert Brown, named sales representative, Michigan territory, Heil Process Equipment Corp., Cleveland.

Rudolph Tietig, Jr., named principal engineer, Steel Plants Div., Kaiser Engineers, Div. of Henry J. Kaiser Co., Oakland, Calif.

Roy E. Fountain, named engineer, advanced value research, manufacturing services, General Electric Co., Schenectady, N. Y.

Dale R. Versaw, appointed purchasing agent, Kennametal Inc., Latrobe, Pa.

Herman Gottwald, named asst. vice president and product manager, valve sales, Meter and Valve Div., Rockwell Manufacturing Co.; **Donald C. Morgan,** named asst. vice president and product manager, gas products sales; **Robert A. Johnson,** named Eastern regional sales manager; **Thomas O. Carson,** named Central regional sales manager.

Robert White, appointed special representative, alloys sales, Houston plant, Sheffield Div., Armco Steel Corp.

Eugene F. Gardner, named sales representative, Pittsburgh office, The Midvale-Heppenstall Co.

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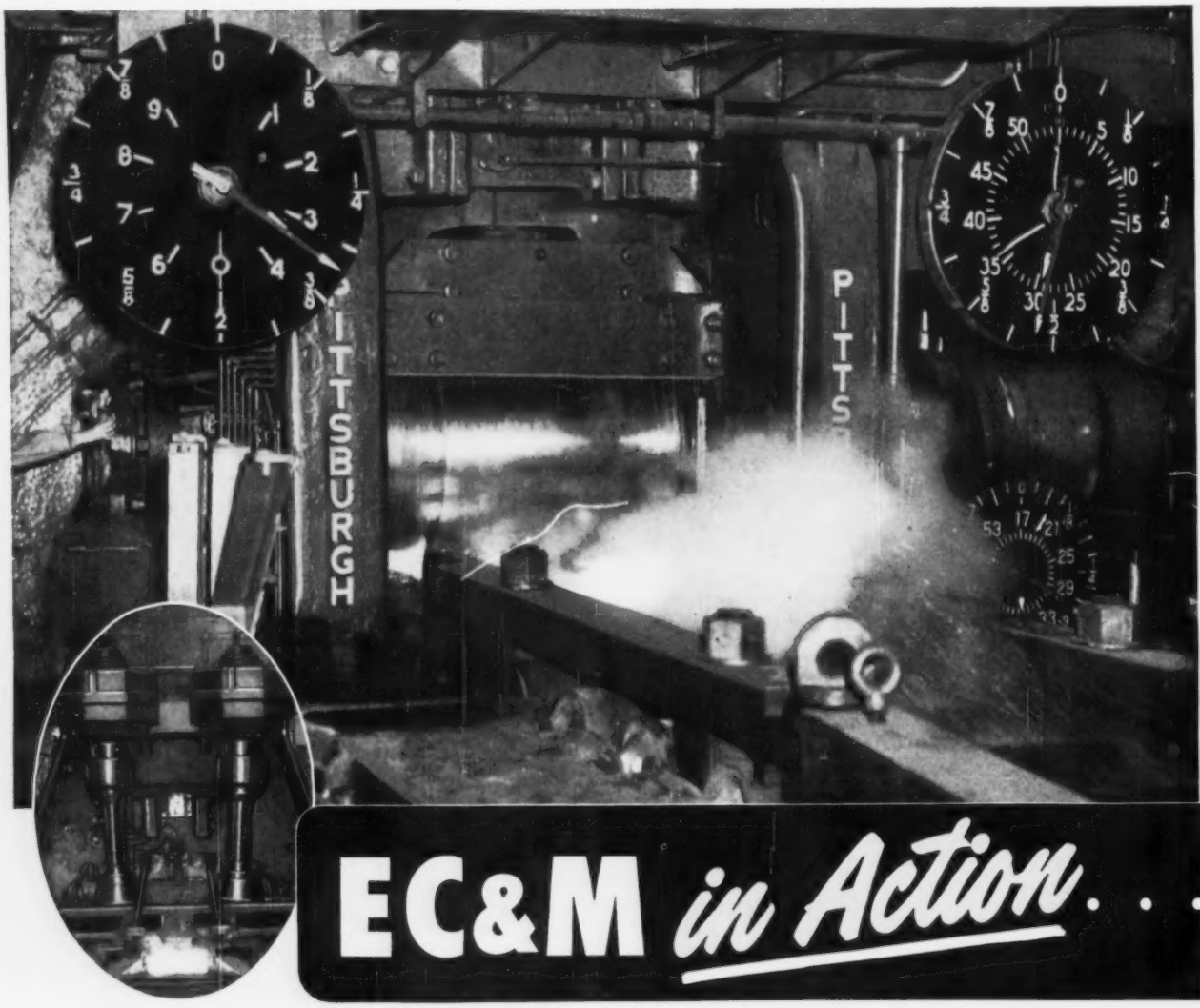


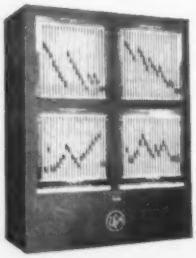
EC&M *in Action* . . .

Slab entering mill between edger rolls.
Top photo shows rear view of mill

SCHEDULING NOW AVAILABLE

By Punched Cards or Slider Panels

at left • **Punched Card Reader automatically signals roll setting for each pass**



at right • **Slider Panel provides roll settings for 2 complete schedules. Pistol-grip switch provides immediate transfer from one to the other**

ON THE JOB SINCE 1952

WORK ROLLS, VERTICAL ROLLS and **EDGER-ROLL GUIDES** on the above Reversing Roughing Mill are positioned automatically on each pass, by pushbutton, under **EC&M AUTOMATIC-POSITIONING** Screwdown Control. One roller controls this mill's operations in which-roll settings are pre-set on direct-reading contact panels. Alternate new method is by **PUNCHED CARDS**. Both of these EC&M systems provide maximum flexibility of screwdown operation.

For the complete story, write for Bulletin 6550

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A DIVISION OF THE SQUARE D COMPANY
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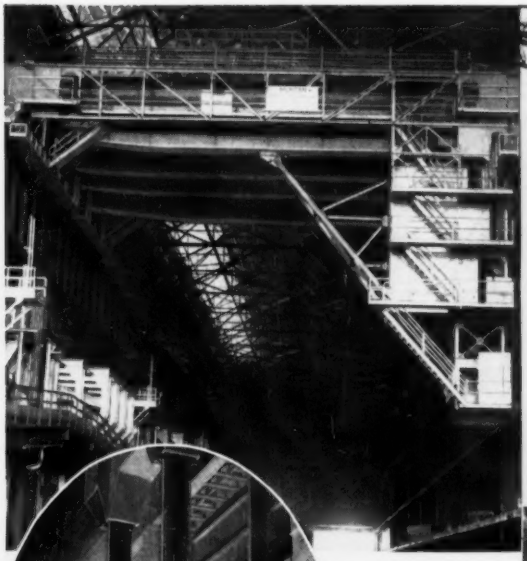
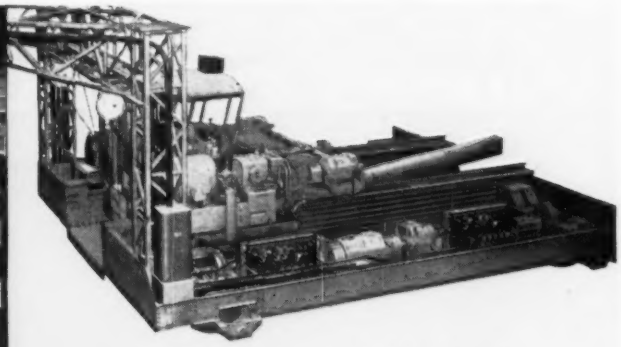
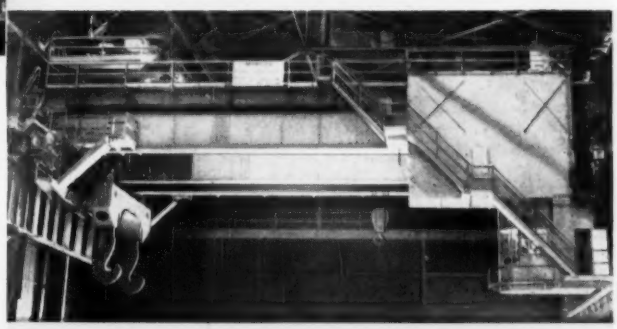
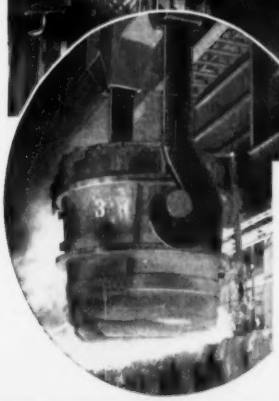




above • EC&M Disconnect Switch, low headroom Controllers, and WB Brake provide efficient control of this Charger.

below • Hot Metal Charging Crane is 100%-SAFELY operated under EC&M Control.



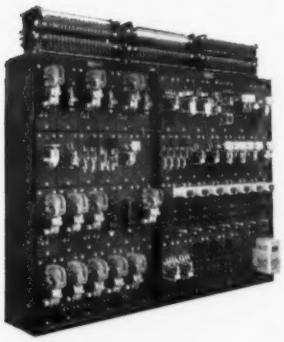


above • 350-Ton Ladle Crane equipped throughout with EC&M Control, Brakes and Limit Stops.

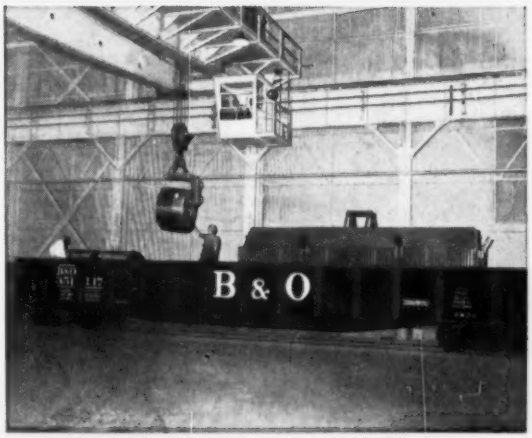
at left • "Jumping" quickly from mold to mold is easy with EC&M **TIME-CURRENT** Control.

. . AT DETROIT STEEL

Modern Screwdown Control & Relay Panel



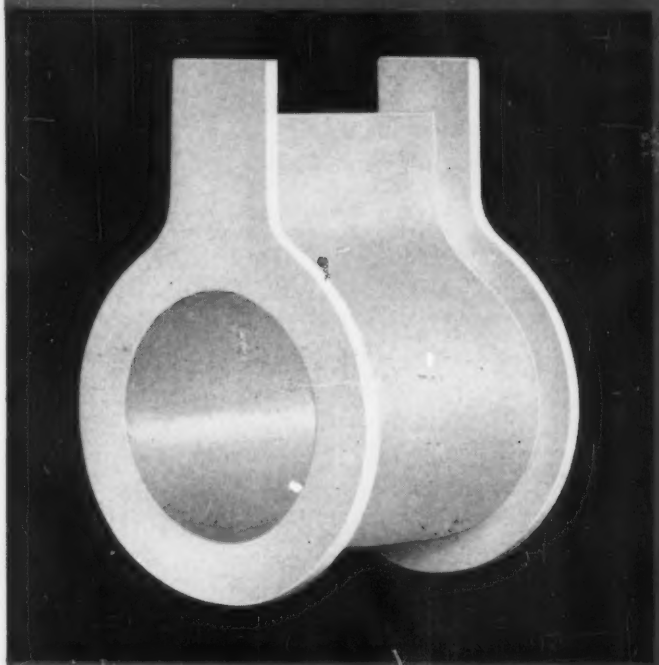
Compact, *factory-assembled* control is completely wired. At left is **TIME-CURRENT** Controller for controlling movements of screwdown motors. Right section of panel contains Relays and Magnetic Amplifiers. Tap Switches on front provide convenient adjustment for best balance-anticipator operation — thus providing quick, accurate stopping of rolls.

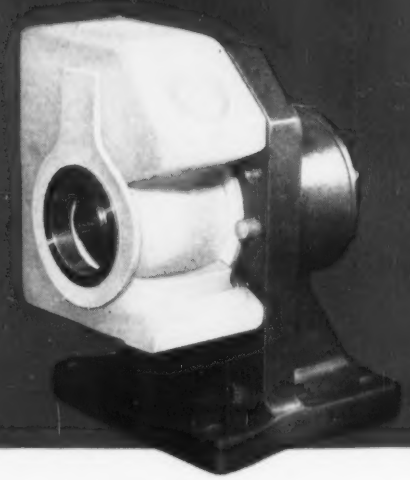


Mill Crane, under EC&M Control, loads outgoing shipments into railroad cars with maximum safety and dependability.

B456

PUMPS FUMING NITRIC ACID 14.7 MILLION CYCLES





...AND THE HEART OF THIS VANTON PUMP IS C/R SIRVENE

Vanton Pump engineers knew what they wanted—a flexible liner for their unique Flex-I-Liner pump that would permit the handling of red and white fuming nitric acid, hydrogen peroxide and other strong oxidizing agents. In addition, high flexibility had to be combined with positive sealing efficiency to protect the rotor, shaft and bearing from contact with the corrosive chemicals. For almost six years Vanton engineers tested various liners and found none that could withstand these unusually severe specifications. Then they turned the problem over to C/R Sirvene engineers. They got the liner they wanted in a matter of weeks. C/R's Sirvene liner, based on the Kel-F elastomer, meets every specification and has been performing dependably for as long as 14.7 million cycles.

If you have a sealing problem—equally critical or simple—C/R Sirvene engineers can help you. They're recognized leaders in the compounding and molding of elastomers for fluid sealing and related applications. They have the research and facilities to solve your problem quickly and economically. Write them direct—or send for the informative new booklet, "Sirvene."

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New Pointers On CO_2 Molding

Has your foundry switched to CO_2 for curing its molds and cores?

Many foundries have. Many more will.

To help keep you abreast of latest developments, here are the results of a practical research program aimed at improving green strength.

▪ Small quantities of low-cost, organic binders can appreciably strengthen CO_2-cured molds. Of the additives tested, dextrin and water-soluble starch proved to have a beneficial effect on green strength.

Such binders are relatively cheap and easy to mix. They may be added to molding sands prior to the addition of water glass.

These and other helpful pointers for "CO_2 process" users were recently reported by the Castings Research Laboratory, Waseda University, Tokyo.

Low Viscosity—For best overall results, the viscosity of the water glass used should be low. But even with higher viscosities, the addition of simple organic binders still improves green strength remarkably.

Low viscosity water glass is not readily obtainable in Japan, according to researcher H. Miyasaka. The main objective of the test program, therefore, was to find organic additives that would compensate for the green strength loss caused by high viscosity water glass.

While most American foundries are not faced with this particular problem, many aspects of the Japanese test program have a direct bearing on American practice.

Check Highlights — Three key points revealed by the tests are especially significant:

(1) Insufficient CO_2 gas pressures have a direct and harmful effect on both the **rate** of chemical reaction and mold strength.

(2) Gas volume produced by CO_2-treated molds at elevated temperatures is considerably less than that produced by either phenolic resin or linseed oil additions.

(3) Maximum strength of CO_2-cured molds is achieved within 20 to 30 seconds of gassing time. Additional time does not appreciably affect mold strength.

Six Grades—The grades of water glass tested, along with mol ratios and viscosity values, are shown in Table 1. Screening results for the sand used in all experiments are listed in Table 2.

To check the relative effectiveness of each water glass binder, water glass additions were varied from 4 to 7 pct of sand weight. Time of CO_2 treatment ranged from 0 to 60 seconds. Time allowed for mulling the various binders with the sand, however, was held constant for all tests.

From the information provided in Table 3, it is evident that extended gassing times have little or no effect upon permeability — regardless of the grade of binder used.

Key Variables—To measure compressive strength, an Amsler type, hand-operated compression machine with a maximum capacity of 300 kg was used. Permeability was measured with a standard AFS permeability tester.

Compressive strengths produced by varying the percentages of each type of water glass, and at the same time varying gas treatment times

TABLE 1. Types of Water Glass Binders Tested

Types of Binders (Sodium Silicate)	Content By Weight, Pct.			Mol Ratio	Viscosity (In Centipoises)	
	$S_i O_2$	$Na_2 O$	Other Additives			
Japanese, Grade "A"	28.55	10.29	None	28.5	10°C 5°C 0°C	90 155 330
Japanese, Grade "B"	39.03	19.18	None	2.09	50°C 40°C 30°C 20°C	1730 4170 12100 —
Japanese, Grade "E"	38.0	12.6	Saccharoid 18.0	3.11	50°C 40°C 30°C 20°C 10°C	87.5 160 300 720 1600
Japanese, Grade "F"	44.0	14.6	Saccharoid 20.0	3.10	50°C 40°C 30°C 20°C	500 790 1900 —
Japanese "Sand Set"					20°C 10°C 5°C	7000 40000 70000
"CO_2 Set— (English Made)	25.70	12.16	Organics 30.0	2.17	20°C 10°C 5°C	2120 7950 17200

TABLE 2. Description of Sand Used

Screening Size, mm	0.297	0.210	0.149	0.105	0.074	0.053	0.020
Sand Retained on Screen, Pct.		12.0	15.8	49.0	16.4	1.6	4.0

Clay Content 1.2%

TABLE 3. Relationship of Permeability-Binder-Gas Treatment Time

Type of Binders	Binder "A"				"B"				"E"				"F"				Sand Set				CO. Set			
Add per cent	4	5	6	7	4	5	6	7	4	5	6	7	4	5	6	7	4	5	6	7	4	5	6	7
Treat. Time Sec.																								
0	23	27	37	35	29	31	38	35	25	33	32	34	29	31	37	38	23	29	29	27	28	31	33	33
20	22	26	36	33	29	33	37	33	25	30	33	35	27	29	40	37	21	28	29	26	28	33	31	33
60	22	26	35	33	28	29	37	33	25	33	33	37	26	27	42	42	22	27	28	27	28	33	31	33

from 0 to 60 seconds, are shown in Figs. 1 to 3.

Of particular interest are the comparative strength values shown in Fig. 4. In this chart, the percentage of silica contained in each specimen (and noted above each curve) is fairly close.

Viscosity Counts—Superiority of the English-made water glass is evident for all gassing cycles. The author suggests that this superiority is due primarily to a lower viscosity, resulting in faster and more effective chemical reaction.

Because of the extra-high viscosity of water glass Grade B, complete mulling was difficult. Mulling was more satisfactory with Grade A, but strength was relatively low. For this reason, Grade A was chosen for testing the effectiveness of additions of organic binders.

Binders Help—Results of these tests are shown in Fig. 5. In general, the addition of an organic binder tended to increase permeability. In all cases, the organic binders were added to the sand prior to mulling with the water glass.

Since the "CO_2 process" involves a chemical reaction, the pressure at which the CO_2 gas is introduced is likely to be a significant factor. To measure the effects of gas pressure, tests were run on samples treated at various pressure levels.

Low Pressure—The lowest pressure level tested was 1.03 atmospheres—virtually the equivalent of normal atmospheric pressure at sea level. Results of the pressure tests are shown in Fig. 6. They reflect the effectiveness of higher pressures.

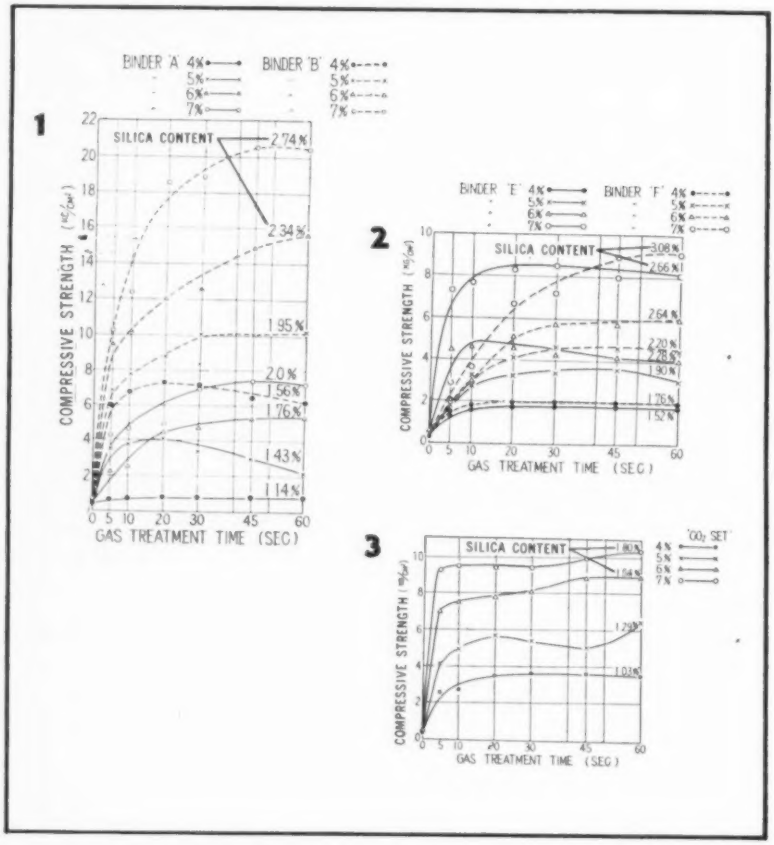
As generally expressed, the chemical reaction produced by CO_2 curing is represented by the equation:

$$Na_2SiO_3 \cdot xH_2O + CO_2 = NaCO_3 \cdot xH_2O + SiO_2$$

From the equation, the chemical reaction appears to be irreversible. Mr. Miyasaka disagrees with this view, largely because compressive strength is directly affected when the cured specimen is exposed to the atmosphere for a period of time.

Time In Air—Tests dealing with the effect of atmosphere on CO_2-cured specimens indicate that a change in compressive strength is usually encountered within the first 2 hours after curing. Oddly enough, this effect may be to either lower **or** increase compressive strength, depending upon the grade of water glass used.

After 3 or 4 hours in atmosphere, however, all compressive strengths begin to improve. This upward trend continues for at least 48



Figs. 1-3: These charts compare relative compressive strengths as they are affected by gas treating time, type of binder, and binder content.

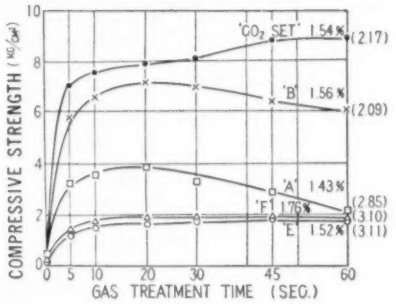
hours. In some cases, strength is increased by as much as 50 pct after the 48-hour period.

Gas Released—Another series of tests measured the gas volumes and pressures produced by CO_2-cured specimens at 900°C. Results were compared with those produced by specimens containing either 2.5 pct linseed oil, 6 pct clay, or 6 pct phenolic resin. In each case, the specimens were properly cured prior to testing.

Relative gas volumes and pressures obtained are shown in Figs. 7 and 8. Note that while CO_2 curing produces higher initial gas pressures, such specimens evolve lesser volumes of gas.

Fig. 4: Compressive strength vs. gassing time when silica content is almost similar. **Fig. 5:** Effect of organic binders on compressive strength. **Fig. 6:** Effect of gas pressure on strength. **Fig. 7:** Gas volume generated at 900°C. **Fig. 8:** Gas pressure generated at 900°C.

4



(NOTE: PERCENTAGE FIGURES ABOVE EACH CURVE APPLY TO SILICA CONTENT. FIGURES IN PARENTHESES ARE MOL RATIOS FOR EACH TYPE OF WATERGLASS.)

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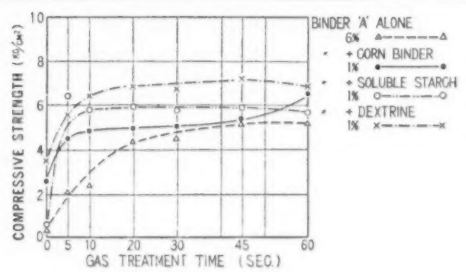

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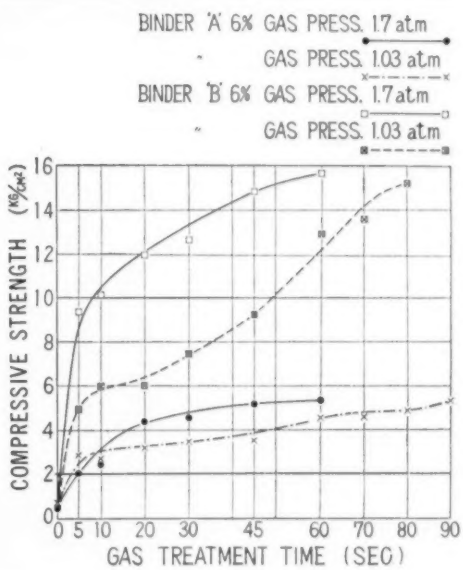
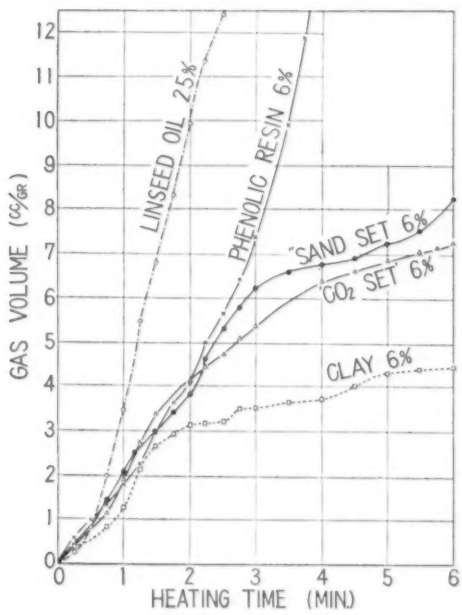

BINDER 'A' 6% GAS PRESS. 1.7 atm
GAS PRESS. 1.03 atm
BINDER 'B' 6% GAS PRESS. 1.7 atm
GAS PRESS. 1.03 atm
COMPRESSIVE STRENGTH (KG/CM²)
GAS TREATMENT TIME (SEC.)

7



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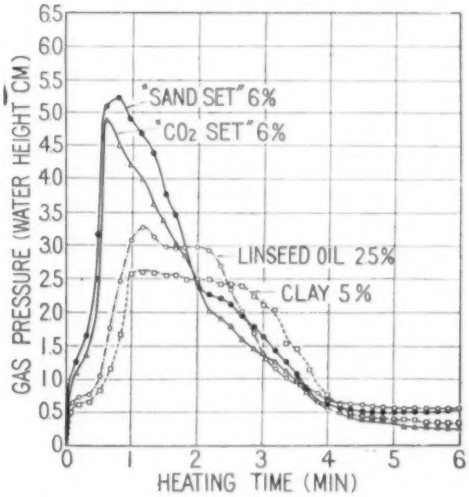


Brazed Tubing Bends To Many Product Needs

By W. G. Patton—Engineering Editor

Copper-brazed steel tubing was a commercial unknown 25 years ago. Today it finds its way into scores of commercial applications.

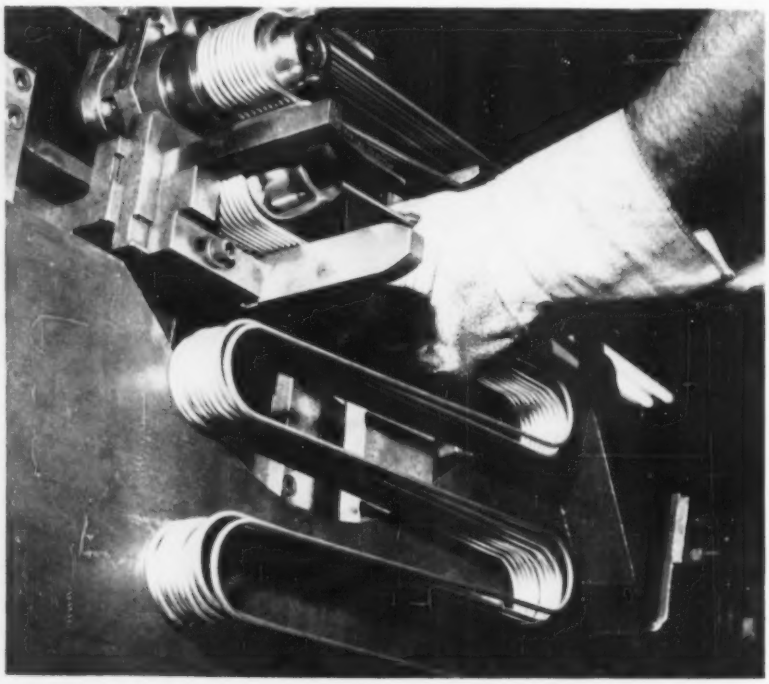
Fabricating the material into quality end-products — economically—can be quite a trick. It takes special tooling and techniques.

▪ Brazed, double-wall steel tubing is one of the most willing materials you'll find in a metals fabrication shop. It can be readily bent, shaped, grooved, coiled and sawed. Double wall tubing can be cold upset, flanged or pierced. It can be notched—if you know how—without leaving a burr or a chip on the inside of the tube. It can be beaded, flattened or expanded, machined or ground.

In fact, you can do almost anything with it in the way of multiple bending and forming. This is one of the reasons why this versatile product, as produced by Bundy Tubing Co.'s fabrication division, is used today in 95 pct of our automobiles (average applications per car, 20); in refrigeration, and in other areas where non-corrosive liquids have to be carried in strong, small diameter tubes.

New Uses Found—What's more surprising is a growing list of applications like automobile V-8 engine push rods and similar uses, where cold hard-drawn tubing has replaced forged and machined parts formerly made of solid steel.

A number of applications have been found for precision-formed steel tubing outside the cost-conscious automobile and refrigeration industries. Lines for gas stoves and heating elements for electric stoves, percolators, skillets, irons and immersion heaters are examples. In these applications, heating elements are positioned inside the tube. The tube is then packed with magnesium oxide and the part is formed to the desired shape.



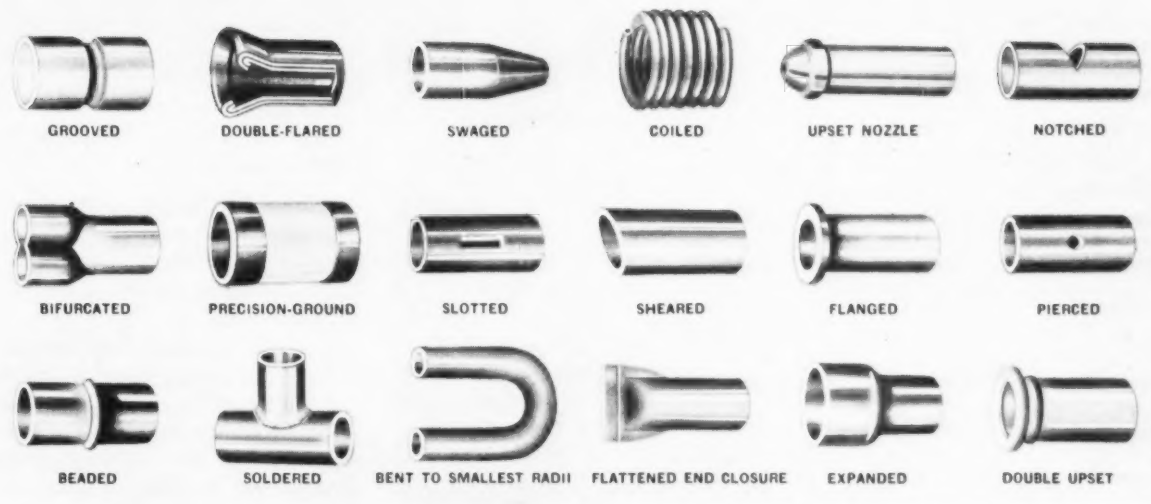
CUTS COSTS: Up to 10 tubes are bent in a single operation, in a few seconds and with only one clamping, in this bending machine. Final positioning of legs of coils is done in another machine.

Behind It All—Double-wall steel tubing's inherently desirable properties of high strength, internal cleanliness, accurate wall thickness and ease of forming have undoubtedly promoted this wide acceptance. But another factor also stands out as important.

This is that every major piece of tube manufacturing and fabrication equipment at Bundy's fabrication plant in Detroit, with the exception of brazing furnaces, was designed by Bundy's own engineers.

Explanation for this is simple. A piece of tubing up to 40 ft long that is bent in all sorts of complex configurations doesn't lend itself readily to automation, except possibly in handling and assembly of fittings. Formed tubular parts are usually tailor-made. A few runs are long. In this case, costly machines can be justified. However, many orders—probably the majority of all Bundy orders—call for limited quantities of precision formed, irregularly shaped pieces of tubing.

Puts Premium On Ingenuity—This means special tools and man-



MEET VARIED NEEDS: An almost infinite number of bends, angles, radii and sizes must be handled.

ual handling. It also means tools must be built quickly.

In this situation, Bundy engineers have seized every opportunity to keep the company competitive. Using its own tools, inventiveness and experience, the company has concentrated on tooling designed for combined operations. Examples include multiple bending; offset bending and upset; end shearing and bending or forming; flattening, bending and forming; bending and crimping.

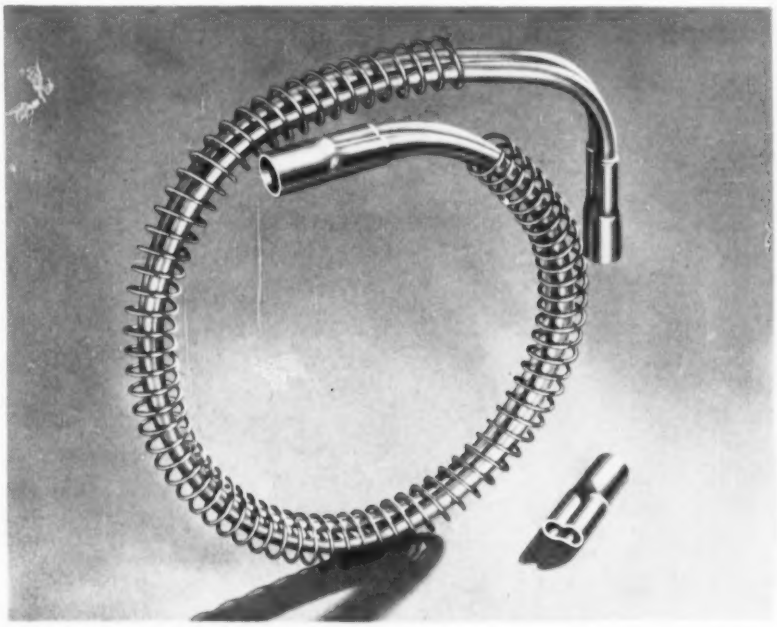
Same Idea Holds — In each of these applications the principle is the same. Only one clamping is required. Bending sequences are worked out so that parts are uniform and not overstressed locally. Tooling has been designed, for example, that makes up to 30 bends in gasoline lines for automobiles with only one handling. Basic equipment is designed so that only the forming tools need to be changed when new models are introduced.

Similarly, involved bending operations are being performed on refrigerator parts. Shown in an accompanying photograph is a coil for a refrigeration compressor. Overall length of the coil—from end to end—is being held to within ± 1/32 in. Radius is held to ± 0.015 in.

Multiple Problems—Actually, an infinite number of bends, angles, radii, sizes and accuracies must be handled in a tubing shop like Bundy's. In a single day at Detroit more than half a million pieces may be produced. The company also designs tools and machines for its tubing customers as well as its five associated plants located abroad.

One fact always confronts the maker of fabricated tubular products. If bends are off or if the length of legs is not held closely, welding, brazing or assembly operations may be held up. Actually, many of the tightest tolerances are imposed to accommodate the customers' assembly operations.

Outmaneuvering Costs — Ability



FOR PROTECTION: Spiralling tubing around other tubing serves, in case of this refrigeration compressor coil, to suppress vibration noise and minimize fatigue failures.

to combine operations has been a factor in holding down costs during a period of steadily rising prices. Another hedge against price increases is multiple bending. In its own serpentine bending machines the company bends up to 10 tubes in a single operation. There is only one clamping. The operator goes through the entire sequence of making 10 bends in a few seconds. Final positioning of the legs of the coil is done singly in another machine. Terminal positions are held within $\frac{1}{8}$ in.

Probably the most interesting fact about the serpentine bending machine is its flexibility. Radius of the bends, number of bends, length of coils etc. can be changed in a few minutes simply by changing the form tools and resetting the controls and stops on the machine.

Several different refrigerator coils are being made currently on the machine shown on p. 102.

Removing Burrs — Another example of an efficient production machine is the equipment used for deburring. Where double-end deburring is required in straight tubing up to 4 ft long, automatic feeds and automatic cycling are often used. Where runs are shorter and tubes are harder to handle, semi-automatic machines are used.

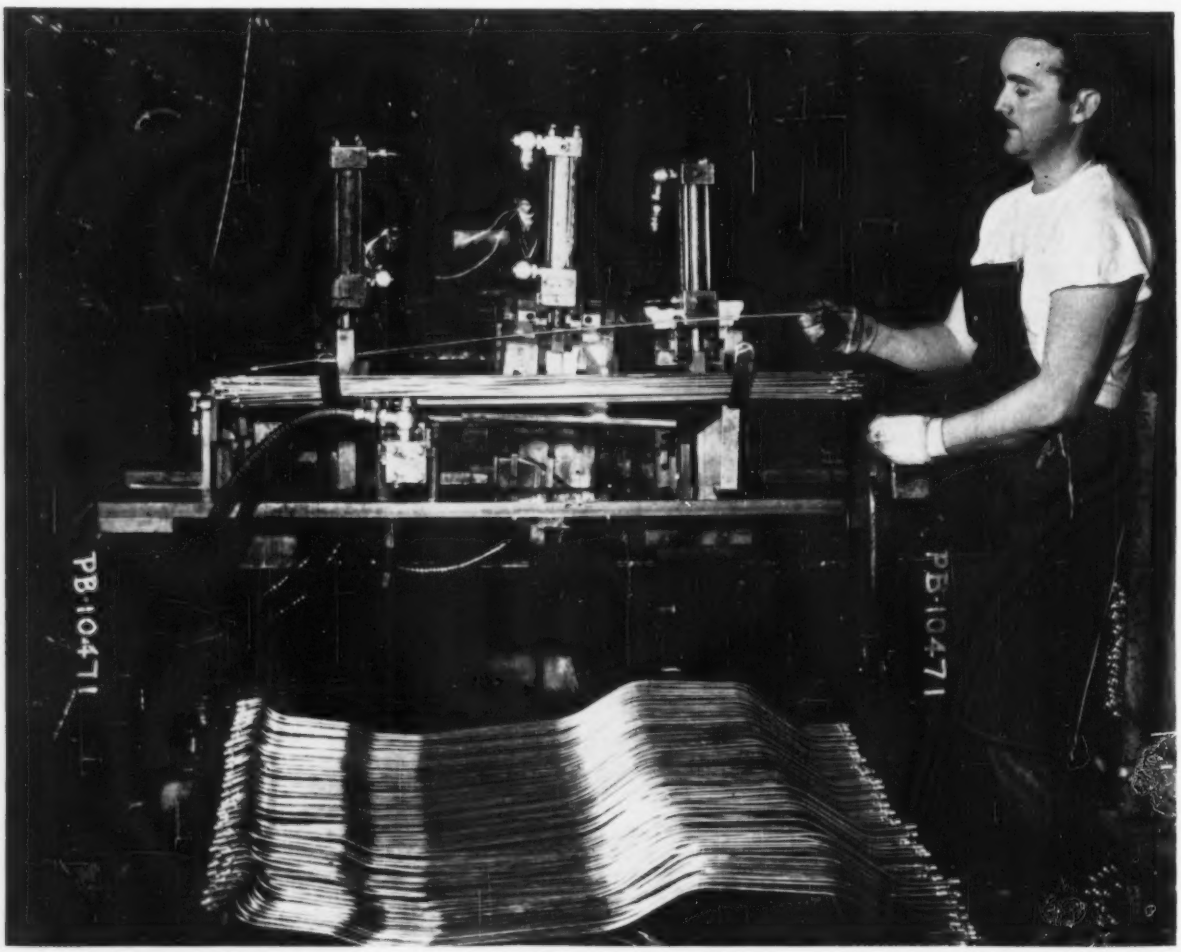
Placing the tubes in the proper position actuates the machine. The operator releases the part which is automatically discharged. All of the Bundy machines operate on this principle of combining minimum physical effort with maximum safety.

There's growing use of Bundyweld tubing by the refrigeration industry. Because of this, precautions are taken to keep tubes clean on the inside. Each tube is bright-annealed by furnace brazing and then thoroughly cleaned by blowing chemically-dried air through the tube at high pressure.

Meets ASTM Specs—All tubing is guaranteed to be within the ASTM specification for refrigeration cleanliness of 0.000125 gr per sq in.

In making tubing, steel stock is copper-coated both top and bottom. The copper coating is also beneficial during forming operations, preventing pickup by the tool. Under some conditions, it provides desirable lubrication. At the same time, it provides limited protection against corrosion and may be helpful where silver soldering or tinning's needed.

Regular production is in sizes from



MULTIPLE BENDS: This hydraulically-actuated machine turns out automobile brake- and gas-lines fast.

3/16, 7/22, ¼, 5/16, ⅜, 7/16, ½ and ⅝ in. OD. Intermediate sizes can be made by drawing in a die. Wall thickness ranges from 0.020 to 0.060 in. Wall sizes are being held to within ± 0.002 to 0.003 in.

Case In Point—A typical formed part is the compressor coil shown on p. 103. This coil had to be compact to fit in a limited space. In this application, double tubing was used to permit maximum flexibility while providing optimum liquid carrying capacity. The wire coil spring helps to damp out vibration.

This is an excellent example of a part that has been carefully engineered to do a particular job.

An example of a part having different requirements is the evaporator coil for a home freezer. This is formed manually on a fixture. Length of the tube is 80 to 125 ft. To minimize floor space requirements and simplify handling, the operator turns the fixture which winds the tubing into the desired shape. In addition to accuracy with respect to the position of the ends of the tube, the position of a small offset in the tube must be closely held.

This fixture is designed so that tooling can be changed to make other products using approximately the same setup.

How About Accuracy? — Generally speaking, the smaller the part, the greater the accuracy required. However, where high accuracy is necessary, tools can be built to give the accuracy desired at a specific location. If necessary, another tube can be used to insure rigidity of the part at a particular point.

Armoring can be used to protect tubing from wear, damage during handling, or vibration. Woven loom, wire coil springs or tubing have been used successfully to protect lines, resist damage during handling, or to prevent damage or distortion during assembly.

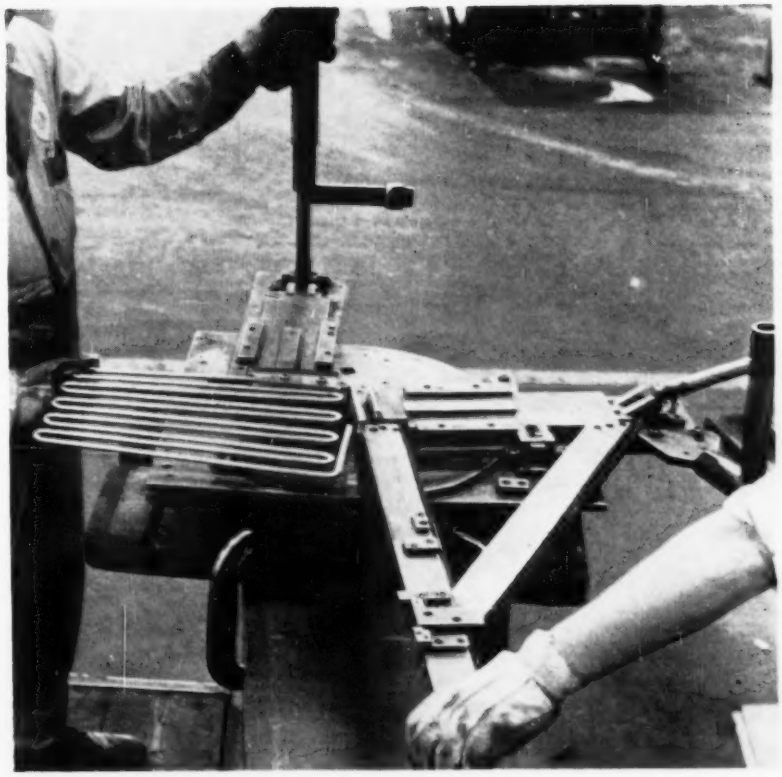
Replaces Rods—Push rods made from seam-welded Bendy tubing have replaced solid steel rods in several of our modern V-8 engines. The tubing is lighter and permits lubrication of the valve train. Pin or mandrel drawn tubing is specified to hold desired OD and ID diam. accuracy and develop minimum 85,000 psi tensile strength.

The rods may have a ball or socket on the end, or they may be integral. In this case the ends are formed into a spherical surface.

An example of the use of Bundyweld tubing for an interesting and quite unusual application is the 6-way seat for passenger cars.

Tubing Houses Shafts — The design utilizes a six-way electromechanical seat actuator. An electric motor drives three flexible shafts carried inside the tubing.

Bundyweld brazed tubing's smooth interior surface prevents wear on the flexible drive shafts, at the same time providing the necessary high strength.



FINISHING TOUCH: Operator puts final leg bend on condensing coils with this special fixturing arrangement.

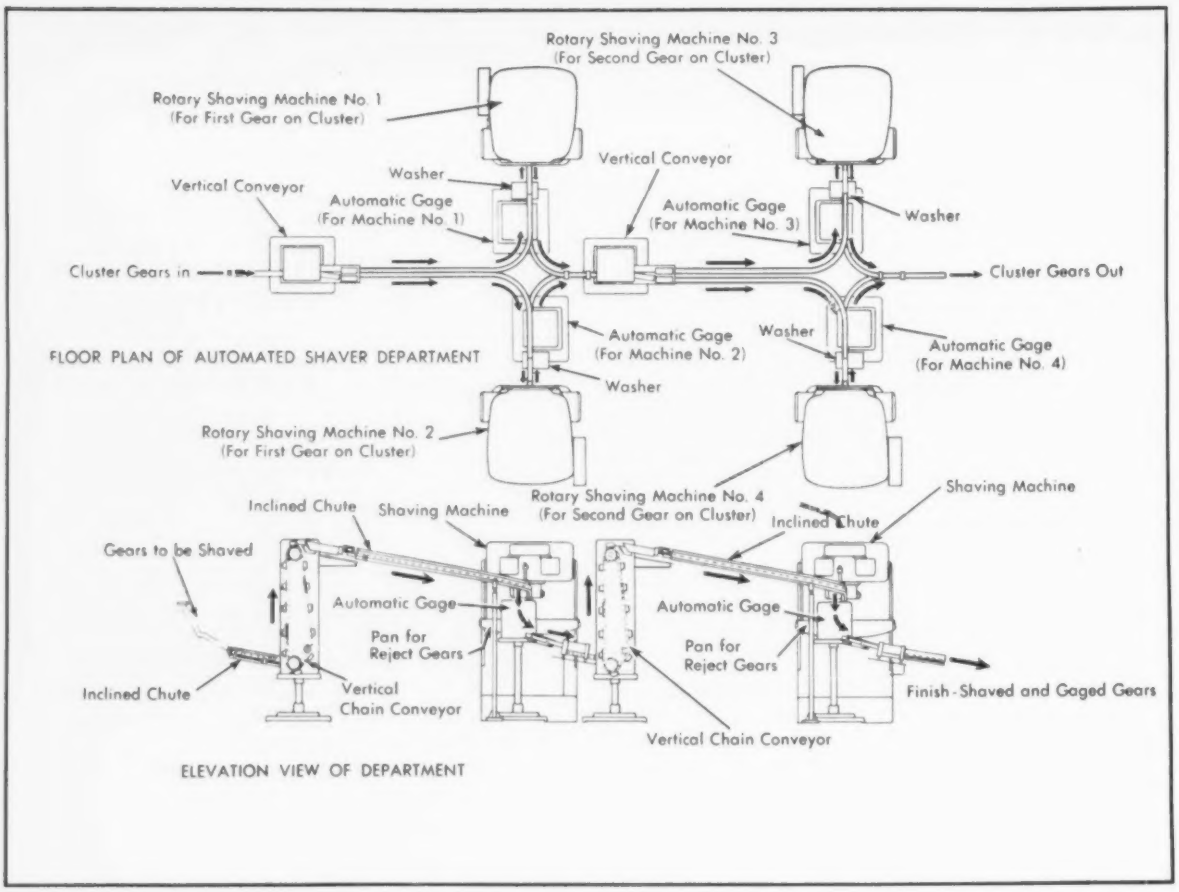
TYPICAL APPLICATIONS INCLUDE:

Automobiles—for hydraulic window lifts, brake lines, fuel and oil lines, engine push rods.

Appliances—television antennas; vacuum-cleaner runners; flash tubes and supply and pilot lines in gas ranges; air conditioners; condenser and evaporator coils in home freezers; coils, condensers and refrigerant lines in refrigerators.

Machinery—fuel, oil and spindle moistening systems in cotton pickers; fuel, oil and hydraulic lines in bulldozers.

Miscellaneous — thermometer sheaths, camera tripods and electric lamp frames, wheel chairs, water coolers, ball-point pen cartridges for ink, awning frames.



HERE'S INTEGRATION: Plan and side views show details of setup for saving and gaging cluster gears.

Shave and Gage Cluster Gears In Automated Setup

Call it automation or anything else you want. The fact remains that "no-hands" processing keeps right on growing.

Gear manufacturing is one of the most fertile areas for this advanced production concept.

Here is one of the latest ideas in that field. It's a fully automatic setup for shaving and gaging two and three-gear clusters.

▪ A simplified system completely integrates the feed and control functions of four gear shaving machines and automatically inspects the finished gears they produce. Inclined feed chutes and motorized vertical chain conveyor act as intermachine storage devices.

The setup, developed and built by National Broach & Machine Co., Detroit, consists essentially of four standard Red Ring rotary gear shavers. Each is equipped with an automatic loader. Gears from each shaver feed through washers and thence to motorized, in-process gear checkers. Those that do not measure up are rejected automatically.

A typical two-gear cluster feeds through the system in the following sequence. A chute receives each workpiece from the previous tooth-forming operation. A bucket on a vertical chain conveyor then raises the part to a short chute that pivots by means of air cylinder control.

Directs Traffic—The pivot chute can direct the gear cluster into either of two additional chutes. These feed the gears to automatic loaders in a pair of machines that shave the gear on one end of the cluster.

If the loading chute for one machine is full, the main pivot chute automatically diverts gears to feed the other machine.

Finish-shaved gears from each machine pass through inclined chutes into washers. From this point they move to automatic motorized gear checkers where they are meshed with a double-pivoted master gear and gaged for size accuracy. Rejects drop into a pan under the checking device.

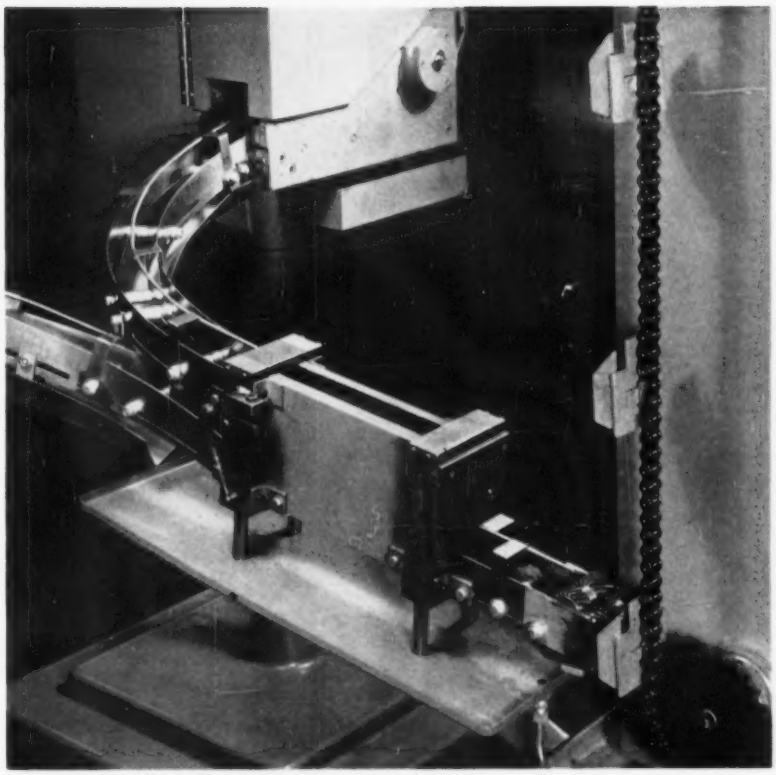
The Other End — Acceptable gears roll around a curve into buckets on a second vertical chain conveyor. This movement turns each cluster end-for-end so that the second gear is positioned correctly for its sequence of shaving, washing and gaging operations.

The automatic gages can be made to shut down individual machines which produce a predetermined number of rejects. In this event, the feed chute for that machine fills up automatically and oncoming gear clusters are diverted to the other shaver. Thus output can continue if one machine is shut down for tool change or maintenance.

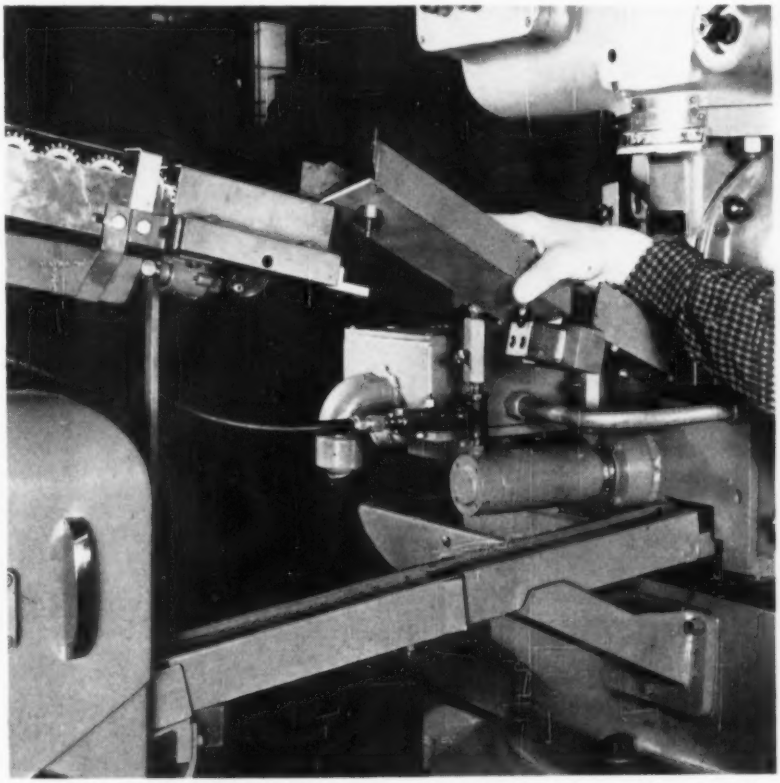
There are individual pushbutton controls for each shaving machine, gage and chain conveyor. This allows each unit to be operated independently for setup or emergency purposes.

If a third gear is included on a cluster, the system can be altered accordingly. All that's needed is to add another pair of shaving machines, a chute-and-chain-conveyor feed, and a pair of automatic gear checkers.

With these added units, the three gear cluster can be processed with no more trouble than the two-gear unit. Operations proceed in the sequence already described, and as shown in the accompanying sketch and photographs.



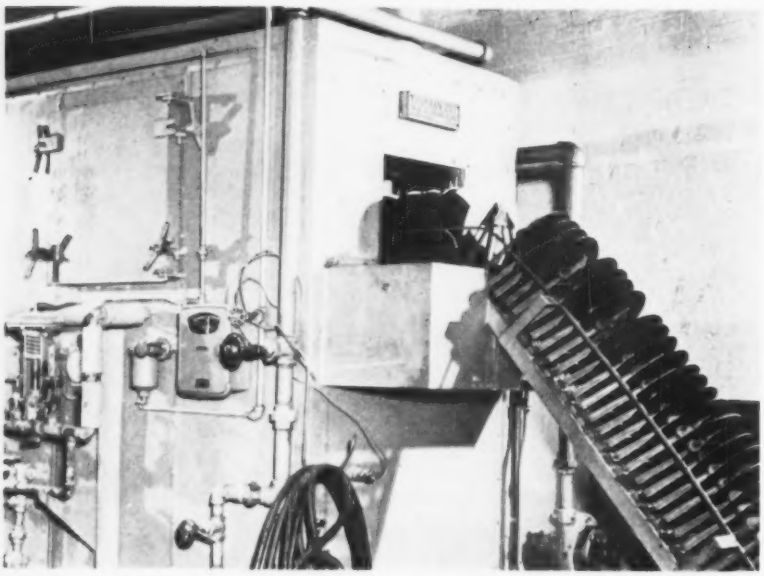
DOWN, THEN UP: Cluster gears from the first pair of shaving machines roll down inclined chutes for hoisting to next operation.



SHAVE AND CHECK: Inclined feed chute (top) connects with automatic loader on shaver. Bottom chute sends shaved gears to checker.

Keep Plant Modernization Within Your Budget

By W. G. Patton—Engineering Editor



GETTING WASHED: Blanks for oil filter shells move from press into washer. Later, they are coated with compound to save wear on dies.

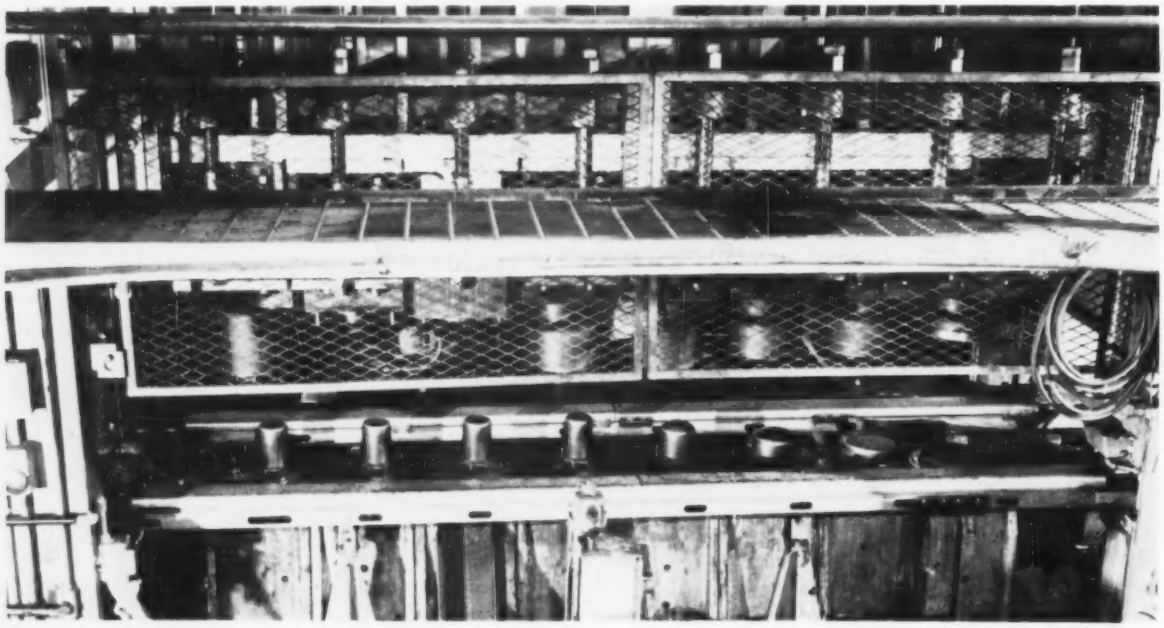
Plant modernization doesn't necessarily mean new buildings and new equipment.

On the contrary, many plants are doing a commendable job of restoring old buildings and fitting standard machines into well planned integrated setups.

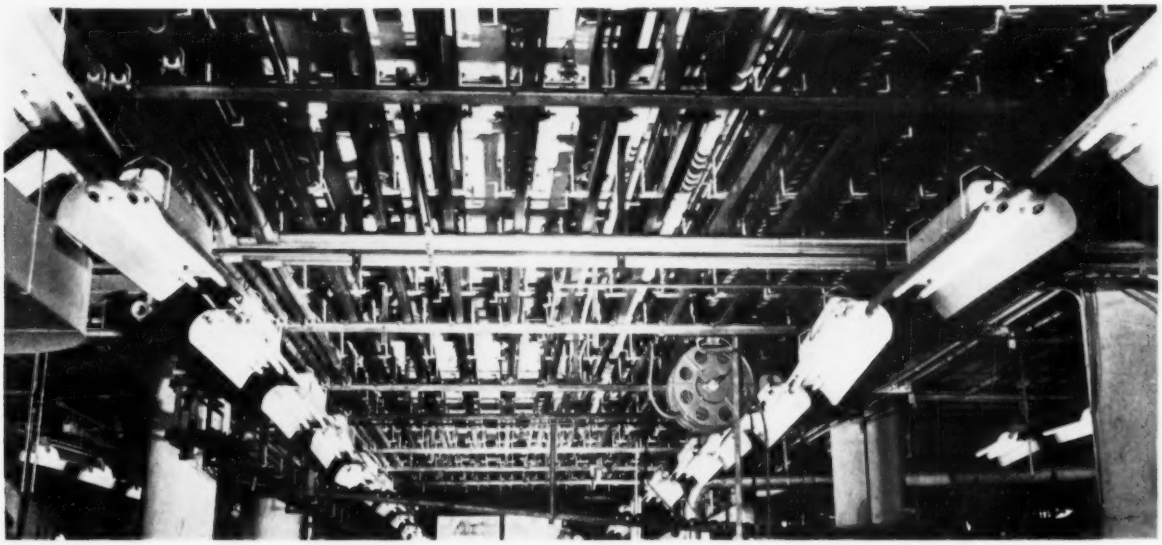
Here's an example of how it's done.

▪ The mere mention of plant modernization has had some plants thinking of new buildings, new layouts, specialized machines and a lot of expense. It's a high price to pay, they think, for attaining that extra margin of efficiency. But some plants find that this just isn't so.

The modernized oil filter shell



EIGHT STAGES: Blanks feed into this Verson press from right and formed shells exit from left. It makes 10 pieces per minute, each station performing an operation with every press stroke.



COMPACT STORAGE: Overhead conveyors hold up to 6000 shells. There are 15 lines, each running 136 ft in length. They feed parts to lathes in groups as they are needed.

production lines at AC Spark Plug Division's plant of General Motors at Flint prove the point. Results show that top-notch efficiency can be attained with an assortment of standard equipment laid out properly in an existing building.

What It Takes—A high-production setup like the one at AC isn't just put together. It takes careful planning each step of the way. There are certain other elements, too, which help to give such a program the needed impetus.

At AC, there was a strong desire to keep production at peak efficiency. It also took a well-organized and expertly directed team of manufacturing personnel to carry out such a program. The team itself had to have foresight and ingenuity to couple standard pieces of equipment into an integrated high-speed line, sometimes with unique handling devices.

The Pay-Off — AC has gained many benefits by modernizing its lines. Production for a given floor space is now more than double the previous output. Except at one point, all previous manual handling has been eliminated.

Another significant feature is that the areas which were occupied by tote boxes and racks are no longer needed. Instead, extra space has been gained by storing shells on conveyors as they move from one operation to another.

Extreme flexibility in the line is still another asset. Any tieup in the line can be easily and quickly isolated. Production losses are thus held to a very low level. If there's a change in product design, it can be accommodated without difficulty.

Lower Inventory — What about the dollars-and-cents factors? One feature is that the estimated value of materials in process at any one time on the new line is only half of what it had been. Also, considering the high output, the initial investment is low by comparison with other highly mechanized lines. This means that the annual output for every dollar invested is on the high side. Unit labor costs are lower and product quality better.

In spite of the high production aspects of the line, a considerable amount of diversity has been built into it. For example, the operations include blanking, washing, forming, turning, testing, painting and labeling.

First Step—Operations start at a Verson blanking press which feeds automatically. Scrap is also handled automatically at this point. Blanks are then delivered to a conveyor which moves them to a Cincinnati washer. After washing, the blanks receive a dry-film coating to improve die life and keep equipment clean in subsequent operations.

Blanks are now ready for forming in a Verson eight-station transfer press. This press, too, has an automatic feed and operates at rates up to 10 pieces per minute. It performs eight operations with each press stroke.

How It Works—After returning to its starting position, arms move in on each side of the press. All parts then advance to the next station. When the arms withdraw, the press comes down for the next stroke. At the same time, a new blank feeds into the press as a formed shell is delivered to a conveyor. This conveyor in turn carries it to a storage conveyor.

The storage conveyor presented problems of its own in the planning stages. It had to be of simple design, yet fit into the available space.

Great Lakes Runway Corp., Chicago, built the storage conveyor. It's a chain-type which has a capacity for more than 6000 shells. While on the conveyor, the shells stand on end but must be turned sideways for delivery to four Sundstrand lathes through wire runway gravity-fed

conveyors. Each of these conveyors holds 50 shells. The lathes machine the gasket surfaces.

Does Unusual Job—The storage unit has 15 lines, each 136 ft long. When shells are needed at the machines, the conveyor line nearest the machines releases them in groups. Two conveyor arms move into position automatically, releasing the shells which then roll down the wire conveyor to either of two machines. The supply is also cut off automatically.

Each ceiling storage area has individual controls. After delivery of about half the shells in the first line to the machine conveyors, the remaining shells move into position. More shells move in from behind.

Because the conveyor works only after a group of shells has been delivered to the machines, there's less movement of parts and less wear on the conveyor system.

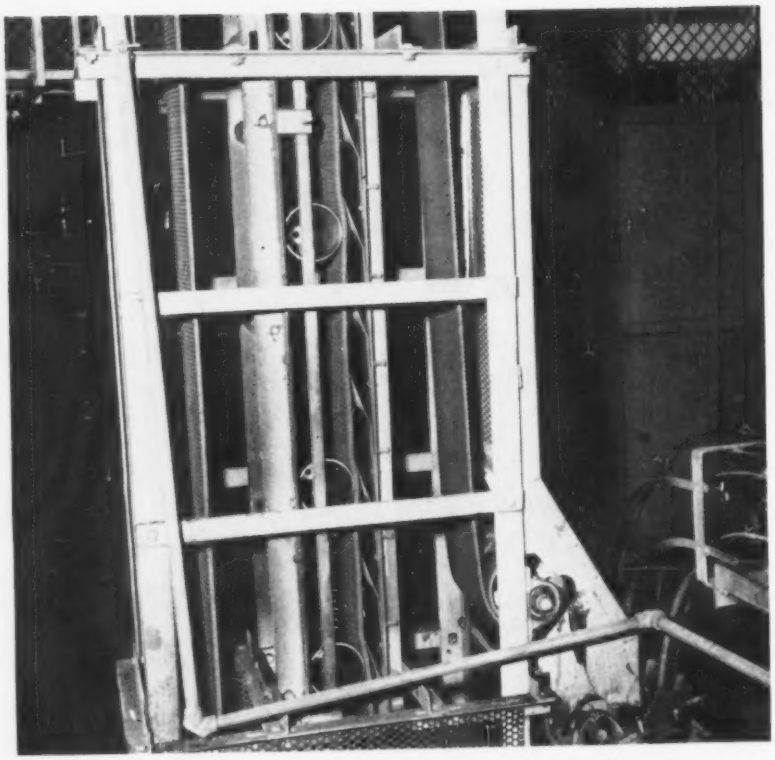
Strengthen Shell—Retainer rings welded to the shell's bottom by a United machine strengthen the gasket surface. Every shell is then leak tested under air pressure of 70 psi. This is one of three manual operations in the entire line.

After testing, shells are hung on an overhead conveyor to be moved to a Cincinnati washer. There, they are cleaned and dried in preparation for electrostatic spraying.

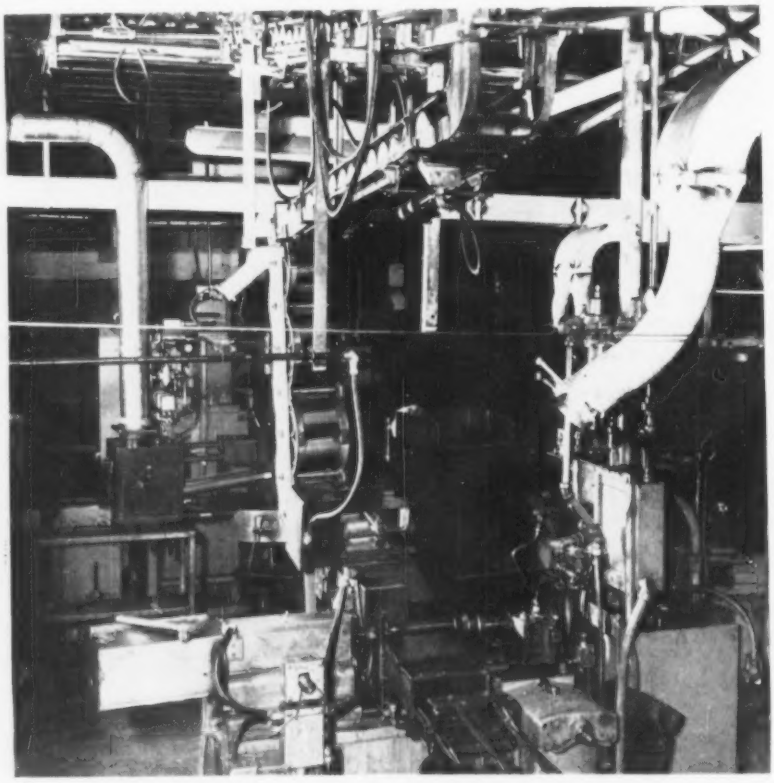
The spray unit, called Lectron, was developed by GM's Process Development Section and is the first to be used in a commercial operation. The unit's two heads receive paint at very low pressure, just enough to bring the paint to the nozzle. From this point, magnetic attraction takes over.

Highly Charged—The paint system operates at 100,000 v. Parts rotate slowly as they pass by the two heads. So fine are the atomized paint particles as they pass from the head to the oil filter shells that the paint pattern cannot be seen.

So far, this new paint system has been exceptionally efficient. Paint savings over conventional automatic paint spraying range around 65 pct.



UPHILL CLIMB: Section of conveyor carries shells to ceiling storage conveyor. Note belt's rough surface to prevent slipping.



FEEDING LATHES: Runway in foreground receives shells from storage conveyor, feeds them to two lathes to machine seats for gaskets.

New Standards Square Up Steel-Tubing Cuts

How square must steel tubing ends be? Answers vary. So for years, users trimmed their own.

But lately, producers have been doing more trimming. The Formed Steel Tube Institute has just adopted new squareness standards.

■ A new table sets up tolerance standards for squareness of end-cuts in welded steel tubing.

The Formed Steel Tube Institute has adopted the recommended tolerances, which will be published in the next revision of the FSTI Handbook of Welded Steel Tubing.

The move will benefit both users and producers of tubing.

Behind The Move—Several reasons prompted the Institute's Technical Committee to tackle the problem. For many years, tubing users followed the practice of taking their own trim cuts from one or both ends of each tube purchased. This was done as a routine part of fabricating operations, prior to final assembly.

Often, the end-condition requirement of the particular component dictated for the user the type of cutting or facing equipment used. In any case, doing the job in their own shops gave fabricators the necessary control over squareness specs.

Back To Producers—But things have changed in recent years. There's been an increasing move toward cost reduction. And with it, tubing users have sought to eliminate the trimming operation by having the tubing producer square ends.

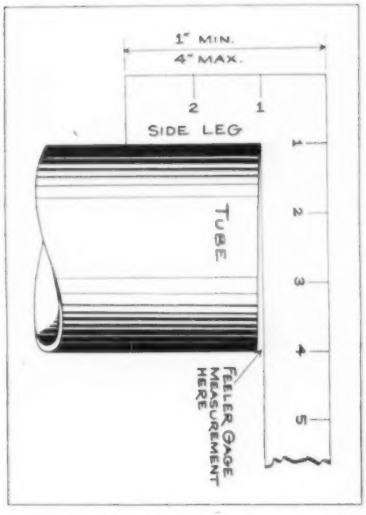
Problem here was that no tolerances had been established by producers for squareness of cut. This lead to confusion, since users couldn't know just what degree of squareness to expect.

For this reason tubing producers decided to set tolerance limits.

Carefully Worked Out—The table worked out by the Institute's Technical Committee, and shown here, stems from careful study of the experience and practice of the quality tube producers. Note that tolerances pertain only to squareness of the ends normal to length of the tube. They do not specify that ends be parallel.

Measurements are made using an "L" square and a feeler gage. Side leg of the square is to be equal to the tube diameter except that it must be within a 1-to-4 in. length range. OD burr is to be removed before measurement is made.

The side length of the square should not exceed the cut length of the tube except in case of tubing cut to length under 4 in.

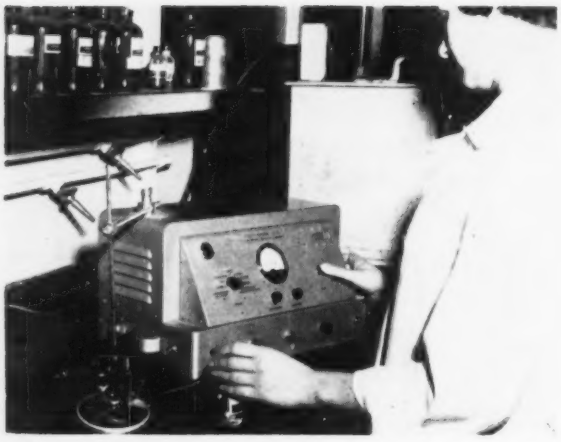


FAST CHECK: Ends are checked with "L" square and feeler gage. Values shown on table below are "go" values of feeler gage; "no go" values are 0.001 in. greater in each instance.

Round Tubing Tolerance For Squareness of Cut (Either End) When Specified*

Length of Tube	Outside Diameter				
	Under 1 in.	1 to 2 in.	Over 2 to 3 in.	Over 3 to 4 in.	Over 4 in.
Under 1 ft.	0.006	0.008	0.010	0.015	0.020
1 to 3 ft.	0.008	0.010	0.015	0.020	0.030
Over 3 to 6 ft.	0.010	0.015	0.020	0.025	0.040
Over 6 to 9 ft.	0.015	0.020	0.025	0.030	0.040

* 1010, 1015 or 1020 steels



THICKNESS: Electronic tester determines how thick electrodeposited coating is.

ROUGHNESS: Analyzer measures surface roughness. From this, leveling power can be determined.

Alloy Plating: Which Way Is It

Alloy plating, despite certain limitations, is stirring high interest as a product finish.

Codepositing several metals at once can result in a finish that combines the most favorable properties of each material.

Outcome of current research will decide alloy plating's future.

BY F. A. Lowenheim—
Supervisor, Electrochemical Research and **R. T. Gore**—
Technical Service Engineer,
Metal & Thermit Corp., New York

■ That alloy plating will be used more extensively by metal finishers is simple economics. Consider the benefits involved.

First, alloy deposits provide combinations of properties unobtainable by plating with single metals. Second, codeposition is becoming simpler and easier. Advances in techniques, improved methods of control and new developments in solutions and anode systems make possible this last.

Alloy plating research aims to develop new coatings that offer greater strength, hardness or toughness, or improved resistance to corrosion, erosion and wear. Devising ways to reach these goals entails problems.

In plating research, composition of the plating bath demands thorough study. Solutions must be so adjusted that metals comprising the alloy will deposit together. This means at the same potential.

But deposition potentials of metals vary in most cases.

Bath Additives—So in alloy plating, it is usually necessary to employ a complexing agent in the bath. The agent causes constituent metals to deposit together at the same potential.

Look at one example of this. Different deposition potentials of copper and zinc make plating this binary alloy from a simple sulfate solution impracticable.

What you want here is an agent that ties up the two metals in a tight complex. You need something which depresses the tendency of copper to deposit. That will allow the zinc to get down at the same time. An alkaline bath employing cyanide as the agent does just this.

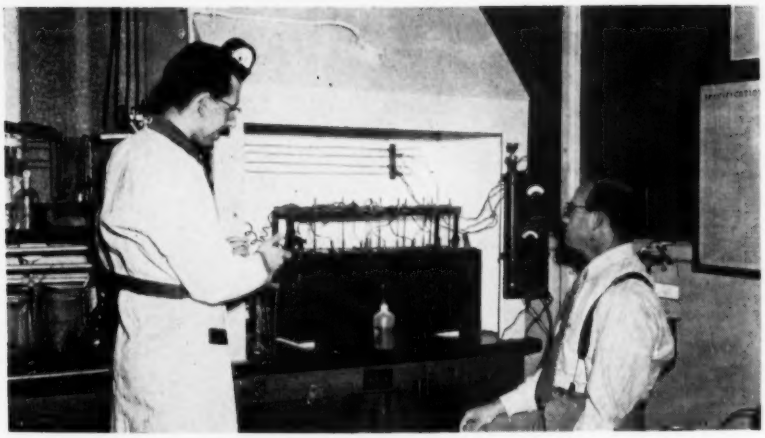
How close should you control plating procedures? Remember that plant technicians, and not research chemists, operate commercial plating baths. So control procedures must be practical. Hourly checks, convenient in the laboratory, are altogether out of place in commercial practice.

Plating Controls—Deposition of some alloys is of course easier than others. Controls when plating with bronze are relatively simple. This is due to a visible color change if alloy composition gets out of limits.

But when depositing two metals of similar color, you need some analytical control. Fortunately, platers now realize the importance of analytical control of all plating solutions. So today they will undertake plating of new alloys which require such control.

Anodes also pose a problem still under study. Dual, single or alloy —each anode type has its advantages and disadvantages that influence alloy baths.

Film Structure—Metallurgy of plated alloys is probably one of the



PLATING CELL: Laboratory tests 12 electroplating solutions at once. Here, interest is in resistance of coating to fatigue.

Headed?

most perplexing problems. It is almost impossible to predetermine whether the same metallurgical structure will occur in plating as in melting.

Sometimes it does not. Tin-nickel is a good example. This alloy deposits as an intermetallic compound which simply does not occur in the thermal equilibrium diagram.

Research groups continue to improve existing baths. Look at progress in reducing solution toxicity.

Toxicity—Cyanide is used as the complexing agent in baths for plating brass, copper-zinc and tin-zinc, for example. Concern over stream pollution and sewage disposal problems led to efforts to replace the cyanide with more easily disposed agents. Tin Research Institute has described a substituted ethylene diamine tetra-cetic acid as complexing agent for depositing tin-zinc alloys.

Much current research is in the tin alloy field. Tin-cadmium is a case in point. The alloy of these two metals should combine (1) the resistance of tin to organic materials, with (2) the resistance of cadmium to salt atmospheres. Such a combination of properties would be especially valuable. Consider how such a coating would meet the need of naval aircraft hydraulic equipment exposed to organic lubricants and to marine atmospheres.

Homogenous—Tin-cadmium alloy films were first produced by the diffusion process—alternate layering and heating. Electrolytic deposition would provide the diffusion in a single operation without layering and heating. Fluoborate and fluosilicate solutions have received attention for this purpose. More recently, a new stannate bath has been developed experimentally.

Tin-nickel is undergoing considerable study. The alloy is already in successful commercial use. Deposited as an intermetallic film containing 65 pct tin, this alloy provides excellent frictional qualities in an attractive coating that resists corrosion as well as tarnish. Throwing power and covering power are both good.

Current tin-nickel research is devoted to improving anode systems. Means of plating fully bright films under all conditions also are under study.

Tin-zinc finds successful use as a high tin-low zinc alloy. It retains its excellent solderability during long shelf life. High zinc-low tin alloys should possess corrosion-resistance and economy with comparable solderability. Tin-zinc has value also in electrical manufacturing as a barrier between aluminum and more noble metals.

Tin-iron and tin-manganese alloys show no usable deposits as yet.

Fluoride Bath—Tin-antimony is reported under study, presumably for bearings. Deposited from a fluoride electrolyte, the alloy is still in the beaker stage.

Tin-cobalt, has also figured in research. It is plated from a bath similar to that for tin-nickel. Short supply and high cost tend to limit its commercial possibilities.

Lead-tin alloys are readily deposited from fluoborate solutions. They offer uniform deposits and a minimum of control. A 93 pct lead-7 pct tin alloy is being electrodeposited. It finds use as bearing metal, and in the graphic arts field. A 40 pct lead-60 pct tin alloy has been used as a solderable coating.

Three Metals—Ternary alloys show promise. The copper-zinc-tin combination is very old. A recent patent covers a new additive agent for use with 60 pct copper-25 pct tin-15 pct zinc deposits. Other ternaries under development include lead-tin-antimony as a bearing metal, and cadmium-tin-zinc alloys for plating military electronic wave guides.

Non-tin alloys still in the laboratory include electroless nickel: a nickel alloy containing 7 pct phosphorous. Zirconium and titanium alloys are attracting interest due to their corrosion-resistance and high temperature characteristics. Commercial availability of these alloys as plating materials seems far off.

Various aluminum alloys are also undergoing research. They call for non-aqueous solutions, and so are not generally considered for widespread use. A new bath has been developed for high speed deposition of white brass.

Research continues in chromium alloy plating. Electroplating a stainless steel alloy may some day be achieved.

Deep-Hole Drilling Converts to Automatic Operation

Precision drilling usually requires a sequence of operations costly in machining time and operator skill.

This is not necessary today. New techniques make possible automatic operation without loss of accuracy.

▪ Deep-hole drilling of bores with up to 15-to-1 length-to-diameter ratios is being done on a mass production basis. A 2-spindle chucker has been converted to automatically drill mild carbon steel blocks. Previously these blocks had been drilled on vertical multiple-spindle drill presses.

Fast Cycle—On special gravity-fed magazines on a Bryant 2-spindle chucker at the Trabon Engineering Co., Solon, O., the blocks are fed into a chute to an air chuck which holds them to 0.001 in. accuracy. The complete cycle requires 95 sec. for two pieces involving 8 operations. The completed blocks are ejected from twin chutes.

The required accuracy is maintained in drilling the blocks, which serve as cylinder blocks for pressure-metering oil to lubrication points. The initial holes are accurate to 0.0005 in. and do not run out more than 0.001 in. in 6 in. of length. You can obtain a surface finish of 10 to 20 microinches.

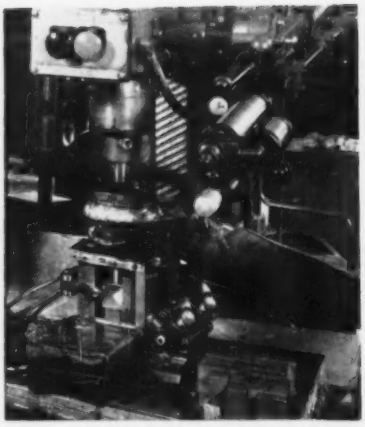
Tungsten carbide drill tips permit drilling at 3 to 5 in. of length per minute. Hones in six sizes range from 0.215 to 0.394 in. diam.

Improved Techniques — Larger sizes of blocks which cannot be handled with the automatic cycle are still bored at Trabon with rifle drilling techniques on vertical drill presses. Rifle drilling refers to U. S. Colonial techniques where accuracy could only be maintained by feeding the rotating workpiece onto a stationary drill. Now the process has been converted to mass production.

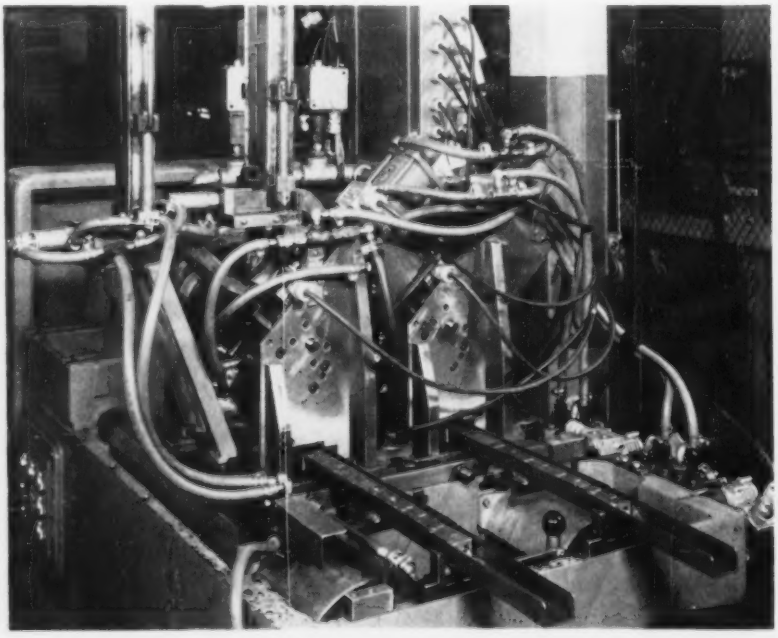
The use of a rotating drill and high speed chucking system allows for faster operation. Bores are finish-broached or honed against air gage measuring equipment to an overall accuracy of 0.00005 in.

Cooling of the drill which rotates at 8000 rpm is maintained by a rotating fluid transfer gland. The rate of flow of the coolant is 5 to 7 gpm.

The combination of the automatic cycle for smaller blocks and the improved methods for larger sizes proves an efficient team.

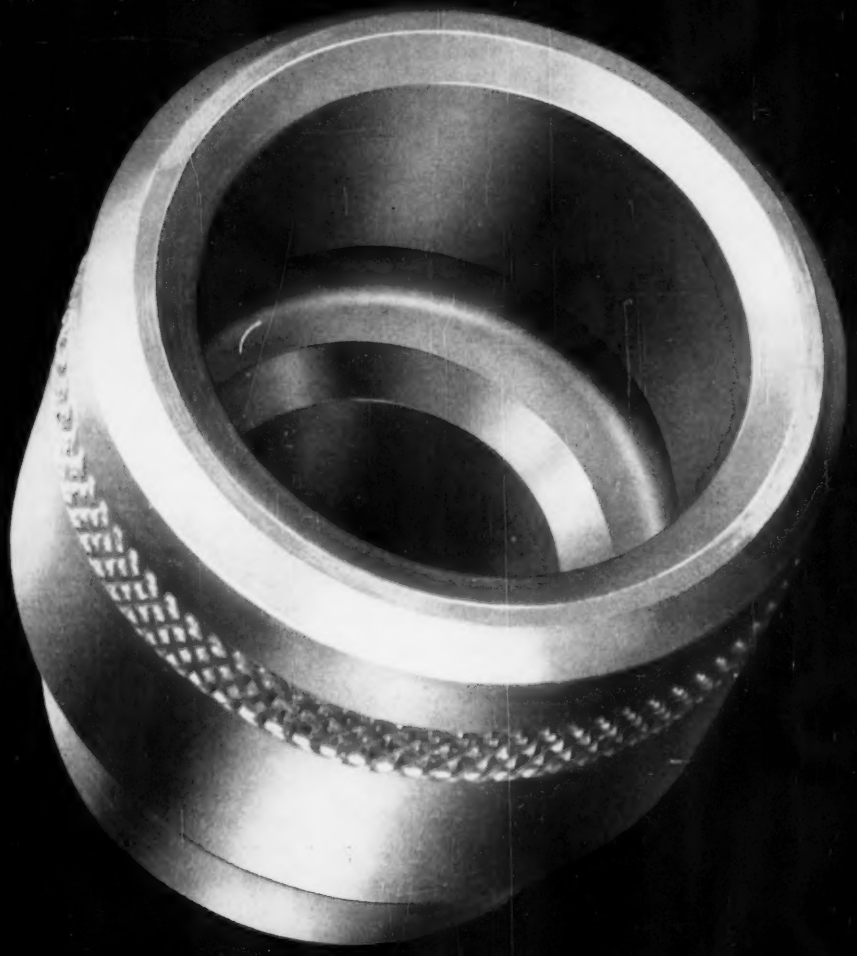


IMPROVED METHOD: For larger sizes of blocks, use vertical drill press with high speed chucking.



AUTOMATIC CYCLE: Converted 2-spindle chucker shows gravity feed and air chucking system. Finished blocks emerge from double trough at right. Hoses connect to high speed air chucks which hold to 0.001 in. accuracy.

Pick exactly the right steel for any job from J & L's complete cold finished line



increased drill life 20% with J & L "1213" steel

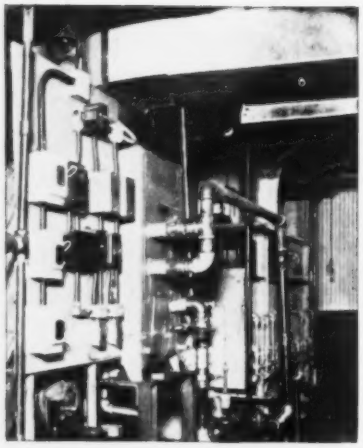
This manufacturer of wrench socket blanks averaged 400 parts per hour when he changed to J & L "1213" steel. Form tool life increased from 10 to 20 hours. Drill life was 20% longer. J & L "1200" steels provide higher cutting speeds, longer tool life. Get facts from your distributor or write to Jones & Laughlin, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

J&L STEEL

Jones & Laughlin

. . . a great name in steel

MACHINING PERFECTION always starts with the right steel



Improve Quenching and You Get Better Heat Treating

● The NIAGARA *Aero* HEAT EXCHANGER transfers the heat from the quench bath to atmospheric air. It never fails to remove the heat at the rate of input, giving you real control of the quench bath temperature. This prevents flashing of oil quenches. In all cases it improves physical properties, saves loss of your product from rejections and gives you faster production, increasing your heat treating capacity. You can put heat back into the quench bath to save the losses of a "warm-up" period.

Savings in piping, pumping and power as well as great savings in cooling water return the cost of the equipment to you in a short time. The Niagara *Aero* Heat Exchanger saves nearly all of the water consumed by conventional cooling methods.

For the complete story of other benefits and savings, write for Bulletins 120 and 132.

NIAGARA BLOWER COMPANY
Dept. IA-4, 405 Lexington Ave.
NEW YORK 17, N. Y.
District Engineers in Principal Cities of U. S. and Canada

FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 121.

Bending

Want to bend something? Two data sheets show how a unit makes 840 bends per hour at one firm, while at another a company improved its service with a two-way bender. Tips on how to prevent excessive tube flattening are contained. (Pines Engineering Co.)
For free copy circle No. 1 on postcard, p. 121

Drop Forge Hammers

Maintenance of steam drop forging hammers is discussed in a 38-page bulletin. It details advice on hammer installation and preventive maintenance necessary. (Erie Foundry Co.)
For free copy circle No. 2 on postcard, p. 121

Metal Stripper

A liquid acid metal stripper is described in a technical data sheet. The new material is an immersion strip requiring no current, and permits the stripping of all commercially plated coatings — except chromium and certain precious metals—from stainless steel or aluminum. (MacDermid Inc.)
For free copy circle No. 3 on postcard, p. 121

Contour Attachments

Design features of two new contour attachments for turret lathes are presented in an 8-page bulletin. The attachments, one a cross slide mounted turning and facing unit, the other a hex turret mounted boring unit, both have a "micro-sensitive" control system. (Warner & Swasey Co.)
For free copy circle No. 4 on postcard, p. 121

Pipe Identification

Accidents caused by turning a wrong valve can be greatly reduced if pipes are identified by contents. How to identify any piping system by colors and lettering is clearly outlined in a new manual on pipe identification just released. (Rust-Oleum Corp.)
For free copy circle No. 5 on postcard, p. 121

Polyethylene

Economical and reliable service provided by polyethylene pipe is described in a new brochure. (Bakelite Co.)
For free copy circle No. 6 on postcard, p. 121

End Mills

A shop wall chart aids in selecting proper end mill speeds for specific applications. It lists recommended surface speeds in feet per minute for most metals and translates these figures into RPM's for end mills of diameters ranging from 1/16 to 2½-in. (The DoAll Co.).
For free copy circle No. 7 on postcard, p. 121

Screw Machining

Equipment and services available at a midwestern screw company is described in a new 8-page brochure. Under one roof at the company's plant are more than 1700 machines and many specialized metallurgical,

engineering, and heat-treating facilities for screw machine work, hot or cold upsetting, and a long list of secondary operations. (Chicago Screw Co.).

For free copy circle No. 8 on postcard, p. 121

Stainless Tubing

In 4-pages, a bulletin briefly tells about stainless tubing and pipe. (Alloy Tube Div., The Carpenter Steel Co.)

For free copy circle No. 9 on postcard, p. 121

Magnetic Chucks

Just off the press is a 28-page catalog illustrating magnetic chucks, holding devices and accessories. (Hanchett Magna-Lock Corp.)

For free copy circle No. 10 on postcard, p. 121

Mill Products

A large metals firm has published an 18-page condensation of its mill products catalog for 1957. New features of this year's edition include information on industrial foil, and revised, clearer weight charts for wrought and casting alloys. (Reynolds Metals Co.)

For free copy circle No. 11 on postcard, p. 121

Prolong V-belt Life

Simple precautions to prolong the life of V-belts, increase drive efficiency and thereby assure full continuous production are contained in a new 12-page bulletin. (Allis-Chalmers Manufacturing Co.).

For free copy circle No. 12 on postcard, p. 121

High-Speed End Mills

Now available is a catalog introducing new end mills. "These end mills give more cutting mileage, greater economy, more production and accuracy because of scientific engineering," the firm says. (Chicago-Latrobe).

For free copy circle No. 13 on postcard, p. 121

Conveyor Belts

Conveyor and elevator belts are covered in a catalog. It gives new

THE PIONEER

in steel shot manufacturing

Pioneered in 1948, backed by 60 years of experience in manufacture of abrasive, Tru-Steel shot was the first high-carbon, fully heat-treated steel shot of tool steel quality.

Tru-Steel has maintained its leadership, with a **special process** to assure solid, round, balanced shot. With sufficient **hardness** to clean quickly and toughness to wear longer, it has five times the life of ordinary abrasive.

Tru-Steel is consistent in chemistry, hardness, grain size and uniform from one lot to another.

It has no equal in general cleaning. Unexcelled for shot peening and sheet or plate descaling.

Available in all SAE sizes in easy-to-handle 50 lb., double walled burlap bags.

TRU-STEEL SHOT®

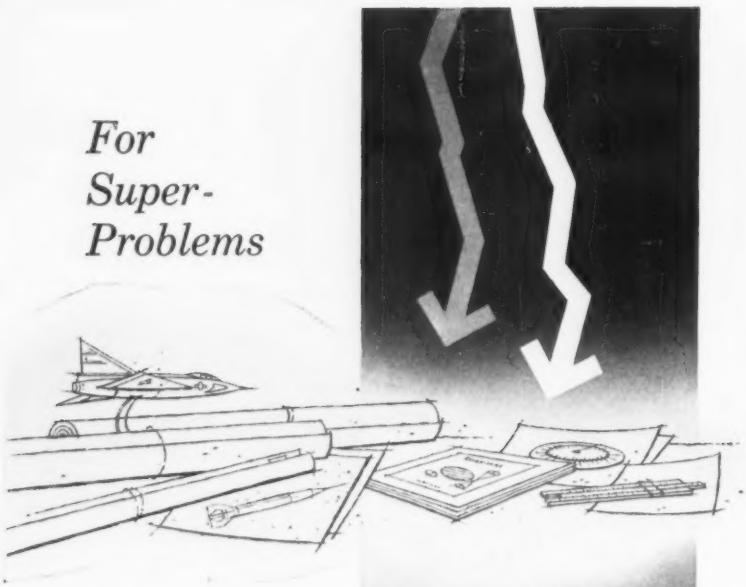
STEEL SHOT PRODUCERS, INC.

Butler, Pa.

Subsidiary of Pittsburgh Crushed Steel Co.

Pittsburgh 1, Pa.

For Super-Problems



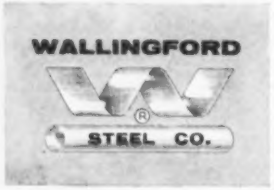
SUPER METALS by

WALLINGFORD

Whether the need is for vital aircraft parts that must withstand the searing heat of today's planes or those still on the drawing board . . . or for equipment used in handling acids and other corrosives throughout industry, Wallingford Steel is meeting the challenge successfully.

Constantly searching for new metals, new methods, Wallingford has long engaged in research and experimentation with high-strength, corrosion-resistant, high-temperature alloys. Research, too, has played a large part in enabling Wallingford to produce the quality stainless steel strip and tubing necessary to meet the rigid requirements of today's applications.

Wallingford's progress aids your progress! Write for further information that can help you solve the problems of today . . . and tomorrow!



THE WALLINGFORD STEEL CO.

WALLINGFORD, CONN., U.S.A.

Progress in Metals for over 35 Years

COLD ROLLED STRIP: *Super Metals, Stainless, Alloy*
WELDED TUBES AND PIPE: *Super Metals, Stainless*

FREE LITERATURE

style designations of general service heavy duty types made with special strength members. Also listed are tension ratings for vulcanized and metal splices, minimum recommended pulley diameters and minimum belt width for good troughing. (Manhattan Rubber Div., Raybestos-Manhattan, Inc.)

For free copy circle No. 14 on postcard, p. 121

Can Machinery

Single, gang and automatic duplex slitters and a scroll shear for medium and high speed can making lines is described in a 12-page catalog. (E. W. Bliss Co.).

For free copy circle No. 15 on postcard, p. 121

Magnetic Engineering

A brochure describes three functions of a company's magnetic engineering laboratory. (Metallurgical Products Dept., General Electric Co.).

For free copy circle No. 16 on postcard, p. 121

Air Filtering

Air handling units that incorporate automatic air filtration are described in a brochure. (American Air Filter Co., Inc.).

For free copy circle No. 17 on postcard, p. 121

Thermal Drying

Technical data appears in a 20-page bulletin on various types of thermal coal dryers. (McNally Pittsburg Mfg. Corp.)

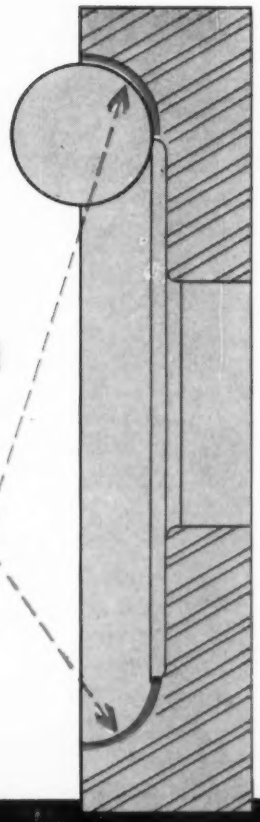
For free copy circle No. 18 on postcard, p. 121

Furnace

A 4-page brochure announces a new mesh belt conveyor furnace for use with a controlled atmosphere. The belt runs through an alloy muffle that is horizontal where it passes through the furnace chamber and sloped downward on either end. This muffle traps both the protective atmosphere and the heat. (Hevi-Duty Electric Co.).

For free copy circle No. 19 on postcard, p. 121

If you have a **heat-treating** job like this



You need an **Induction Heating Machine** like this

New TOCCOtron Machine 50 kw 500,000 cycles

For many years TOCCO has led the Induction Heating Field—manufacturing both motor-generator and vacuum tube oscillator type machines to meet every induction heating requirement. This new 50 KW TOCCOtron unit is a big brother to the 25 KW unit which has been serving the Metal-Working Industry for many years.

Here's What It Does

With a frequency range of 350,000 to 600,000 c.p.s. the TOCCOtron unit is ideal for surface hardening small diameter parts to shallow depths (as the bearing race illustrated above), through hardening or annealing small sections and soldering or brazing small assemblies where the heating effect must be very strictly localized.

The greater capacity of the new 50 KW TOCCOtron *doubles* production rates formerly achieved by TOCCOtron equipment.

A Really Complete Machine

This radio frequency unit is a truly complete induction heating machine. It contains not only all the direct current supply components and the oscillator components, but also all the control components required for either single or two station operation.

Among the standard features of the 50 KW TOCCOtron are:

1. The industrial heavy gauge steel cabinet which completely encloses all high potential circuits preventing radiation interference and personnel hazards.
2. Meters in all sensitive circuits to enable the user to obtain the maximum output and efficiency.
3. 3-phase quadrature filament excitation of rectifiers for maximum life.
4. Externally adjustable grid bias and drive control for ease in setting up new production runs.
5. Externally mounted circuit breaker and disconnect located so that it is easily accessible.
6. Tapped plate transformer allowing variations of plate voltage.

If your operation requires the hardening, annealing or brazing of very small parts in very big quantities the new 50 KW TOCCOtron can do the job better, faster and at lower cost than any other method available.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today— NEW FREE Bulletin

The Ohio Crankshaft Co. • Dept: A-4, Cleveland 5, Ohio

Please send catalog G showing TOCCO Induction Heating Equipment from 60 to 600,000 cycles.

Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State_____

SQUASHED!

Photograph courtesy of Inland Steel Company.

...but not a bit of damage to the galvanized surface

The Reason? A durable, unbreakable bond between steel and zinc, coupled with an exceptional ductility of coating obtainable only when the continuous galvanizing process is used.

The Zinc? Not just any zinc is suitable for the continuous process. It calls for a metal with certain desirable alloying elements, not merely under permissible maximums but within specified maximums and minimums.

St. Joe's contribution to the rapidly growing continuous galvanizing output is to match the demands for this special zinc by a corresponding increase in the output of St. Joe Electrothermic Zinc...the Zinc that is used to galvanize sheet or strip that is to be subjected to severe deformation as severe as that illustrated or worse.

ST. JOE IS THE METAL *EVERY* GALVANIZING PLANT SHOULD USE.

ST. JOSEPH LEAD COMPANY 250 PARK AVENUE, NEW YORK 17, N. Y.

HIGH GRADE
INTERMEDIATE
PRIME WESTERN

ST. JOE *electrothermic* ZINC

FREE LITERATURE

This section starts on Page 116

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Coated Abrasives

Automation and abrasive belts are analyzed in an 8-page publication. It discusses metal removal using coated abrasives. Explained are: (1) a system of tables and formulas to predict abrasive belt performance with accuracy. (2) performance predictions with an accuracy of 90-pct or better, and (3) how to cut costs. (The Carborundum Co.)

For free copy circle No. 20 on postcard

Ultrasonic Cleaning

Ultrasonic cleaning of metals is reviewed in a company's publication. It discusses ultrasonic cleaning, tells why it sometimes offers many advantages, and describes a unit specifically designed for cleaning metallographic specimens. (Buehler, Ltd.)

For free copy circle No. 21 on postcard

Rust Prevention

If you have rust worries, a 14-page folder now being offered could be the answer to your problems. It discusses ways to prevent rust by using petroleum-type coatings, and tells how to select a rust preventive. (Valvoline Oil Co.)

For free copy circle No. 22 on postcard

Steel Mill Equipment

"Iron & Steelworks Equipment" is the title of a 20-page booklet. It pictures and mentions equipment available from a large British concern. Covered are blast furnaces, ore transfer cars, slag ladles and carriages, pig casting machines, hot metal ladles and cars, slag pots, casting ladles, ingot casting cars, various transportation equipment for mills and more. All these are the work of the firm. (Newton Chambers & Co., Ltd.)

For free copy circle No. 23 on postcard

Transformer Upkeep

Tips on transformer maintenance are contained in a 50-page pocket-size book. It discusses transformers and their maintenance and includes such subjects as general inspection procedures, classification of transformers, methods of drying out, and transformer connections. (Westinghouse Electric Corp.)

For free copy circle No. 24 on postcard

Compressors

Horizontal, duplex heavy-duty compressors are reviewed in a 24-page booklet. It covers air and gas compressors of the double-acting, water-cooled type for either single or two-stage compression. (Pennsylvania Pump & Compressor Co.)

For free copy circle No. 25 on postcard

Tramp Iron Detection

Units which spot tramp iron and steel on conveyor belts are covered in an 8-page brochure. It describes a detector which consists of a sensing unit and an amplifier-detector which sets off a warning or stops the conveyor. (Industrial Physics & Electronics Co.)

For free copy circle No. 26 on postcard

Optical Height Gage

Optical height gages are shown in a 6-page folder. It describes the instruments as a "fantastically accurate yardstick which measures heights up to 61-in. with accuracies of ±.000005-in. per inch of height." (Webber Gage Co.)

For free copy circle No. 27 on postcard

Vacuum Cleaning

Stationary vacuum cleaning systems for the removal of all sorts of dust are covered in an 8-page booklet. (U. S. Hoffman Machinery Corp.)

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Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **4/25/57**

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31	32	33	34	35	36	37	38	39	40
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BUSINESS REPLY CARD

No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

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FREE LITERATURE

Pipe Fabricating

How piping is fabricated is told in a 16-page brochure. It shows how a recently formed fabrication team combine their facilities on every step from the preparation of bids to delivery of the finished job. (For free copy, write on company letterhead to Flori Pipe Co., 601 East Red Bud, St. Louis 15, Mo.)

Pushbuttons

Standard- and heavy-duty pushbutton stations are covered in an 8-page publication. It gives ordering, dimensional, and applicational information on standard- and heavy-duty push buttons. (General Electric Co.)

For free copy circle No. 29 on postcard

Abrasive Chips

Abrasive chips and triangular media appear in new literature. It describes abrasive characteristics, provides complete specifications, and explains the product's production advantages. (Macklin Co.)

For free copy circle No. 30 on postcard

Extrusion Press

Aluminum extrusion presses are described in a 6-page bulletin. It gives design features and services offered the extrusion industry. (Watson-Stillman Press Div., Farrel-Birmingham Co., Inc.)

For free copy circle No. 31 on postcard

Roller Skid

Roller skids for moving loads from 1000 to 6000 lb are covered by a new data sheet. It lists specifications and describes typical applications of this heavy duty dolly. (Stokvis-Edera & Co., Inc.)

For free copy circle No. 32 on postcard

Inclining Device

An illustrated supplement to a firm's bulletins introduces a fast-acting air motor inclining device. The device is available as optional equipment on the company's open back inclinable presses (45 to 200 ton models). Clearly described is a simple, safe, air motor mechanism that inclines or brings a press upright over a full 30° range in approximately two minutes. (Niagara Machine & Tool Works.)

For free copy circle No. 33 on postcard

Aluminized Steel

How to get long service life at low cost with aluminized steel (aluminum-coated) building products is told in a brochure. Corrosion resistance, strength, attractive appearance, heat reflectivity, and fire resistance are listed as advantages. (Armco Steel Corp.).

For free copy circle No. 34 on postcard

Packaged Chillers

Nine packaged liquid chillers are introduced in a 16-page catalog. The direct drive units are rated from 20 through 125 tons capacity. (Acme Industries, Inc.)

For free copy circle No. 35 on postcard

Dispersions

Listing 44 colloidal and semi-colloidal dispersions of graphite, molybdenum disulfide, mica, vermiculite, zinc oxide, acetylene black, copper, and glass is a 4-page bulletin. (Acheson Colloids Co.)

For free copy circle No. 36 on postcard

Batteries

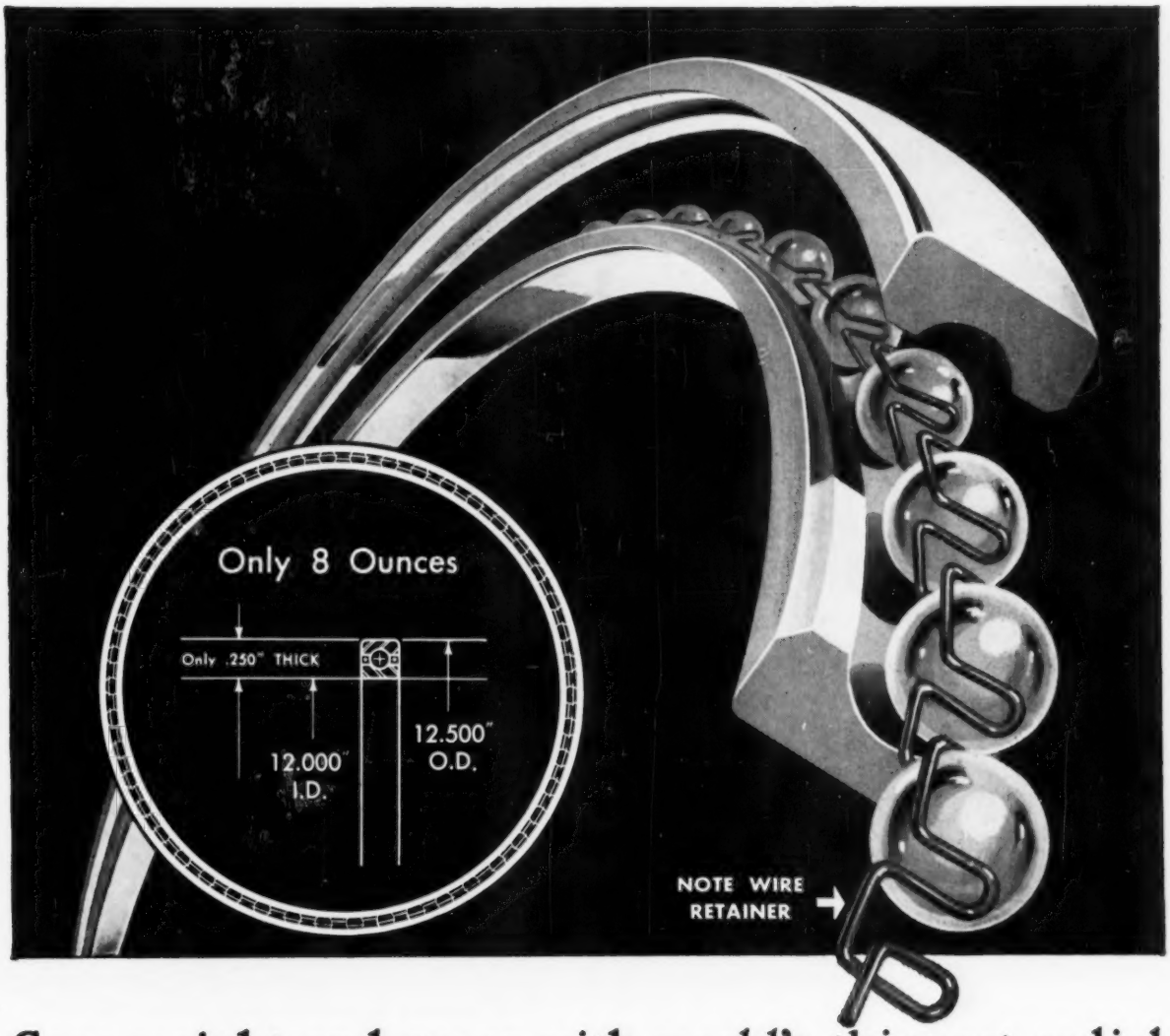
"So You're Going to Buy an Industrial Battery?" asks a 16-page booklet. Then it goes on to tell how industrial battery buyers can select the most economical and efficient battery for their operation. (Gould National Batteries, Inc.)

For free copy circle No. 37 on postcard

Zinc Diecastings

All 67 different types of zinc alloy diecast and thermoplastic molded products made by one company are listed in a catalog. (Gries Reproducer Corp.)

For free copy circle No. 38 on postcard



Save weight and space with world's thinnest radial ball bearings—*Reali-Slim* by Kaydon

HERE it is! A *Reali-Slim* radial ball bearing with a wire separator that has just short of a full complement of balls for maximum capacity. What's more, you still get all the advantages of a separator between the balls. This design also gives you a bearing that's light-in-weight and is, without a question, the thinnest bearing ever built in this diameter.

Whatever your product design, there's a small or large diameter *Reali-Slim* bearing that can be the right answer to your thin-section bearing problems.

The radial ball bearing, illustrated here, is *really slim* — 12.000" I.D., 12.500" O.D., .250" thick . . . *and weighs only eight ounces.* It has 9,810 lbs. static load capacity, 1,256 lbs. at 100 rpm. Kaydon is able to produce *Reali-Slim*, high-precision bearings because Kaydon specializes in the unusual.

Kaydon bearing engineers are prepared to give you valuable help with technical, thin-section bearing problems.

For detailed information on Kaydon's *Reali-Slim* line, ask for engineering catalog No. 54-RS3 detailing:

Reali-Slim Ball Bearings — Conrad, angular contact and 4-point contact types in seven standard cross sections from ¼" to 1.000" and in bore diameters from 4" to 40".

Reali-Slim Roller Bearings — Radial and taper roller types in cross sections from 9/16" and in bore diameters from 5" to 40".

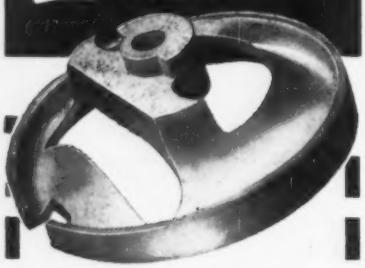
THE KAYDON ENGINEERING CORP.

MUSKEGON • MICHIGAN

K-561

All types of ball and roller bearings — 4" to 120" outside diameter . . .
Taper Roller • Roller Thrust • Roller Radial • Bi-Angular Roller • Needle Roller • Ball Radial • Ball Thrust Bearings.

Cam Milling and Contour Machining *Eliminated!*



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PART: Cam for Aircraft Instrument

MATERIAL: Stainless Steel, 440

PROBLEM: To reduce time and cost involved in setting up and performing 8 different types of machining operations.

SOLUTION: An EPCO Investment Casting Completely dispensed with

1. Cut-off
2. Turning O.D.
3. Center Hole Drilling
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6. Contour Milling
7. Slot Milling
8. Cam Milling

Leaving only cam polishing, bottom grinding and hole reaming.

CONCLUSION: Intricate Machine Parts by redesigning to EPCO Investment Casting tolerances can be made to give *better* performance at far less cost.

Send us drawings, samples and specification of parts for detailed process analysis and cost quotation without cost or obligation.

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MEMBER INVESTMENT CASTING INSTITUTE

Free Piston Engine Uses Few Parts

When parts wear out, replacement means downtime. That goes for electric generators, too.

If your plant sets suffer from such time losses, maybe a free piston gas turbine's your answer.

The engine uses comparatively few parts and adapts to many uses.

▪ Sometimes called "the engine of the future," the free piston gas turbine is now a practical reality. Such an engine is being placed in a converted Liberty ship as its powerplant.

Developed by General Motor's Cleveland Diesel Engine Div., the installation comprises a 6000-shp unit. Bethlehem Steel Co.'s Shipbuilding division, Baltimore, is converting the ship.

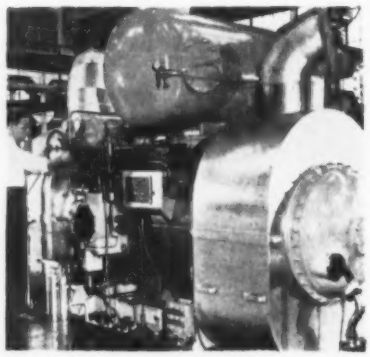
Combines Best—"The free piston setup," says a GM spokesman, "combines the best elements of a diesel engine, an air compressor and a gas turbine." It consists of two major components: a free piston gas generator and a turbine. The gas generator produces hot gases for the turbine. This supplies shaft horsepower.

In operation, an air-fuel charge ignites between the opposed pistons in the cylinder of the gas generator. The pistons spring apart, compressing air at both ends of the cylinder.

Pistons Bounce—This compressed air makes the pistons "bounce" back to cylinder dead center. This "bounce" forces compressed air into the scavenging chambers for the next cycle; it also forces hot combustion gases from the cylinder into the turbine. The hot combustion gases flowing into the turbine cause it to rotate and deliver horsepower through its shaft to the ship's propeller.

The installation in the Liberty ship is the first marine installation of its kind in this country. It's the largest marine installation to date, supplying six gasifiers on a common piping. However, the French Navy is also currently using ships powered by free piston engines.

It's Efficient—Each gasifier in the installation delivers 1233 gas hp at thermal efficiency of 41 pct. The turbine efficiency is 85 pct overall; piping losses are computed at 1½ to 2 pct, with reduction gear losses at 3 pct on actual test evaluation.



This free-piston gasifier produces hot gases for the turbine.

Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 121. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Features of the gasifier include power stroke every revolution or cycle, like a 2-cycle diesel engine; no valvegear, the valves being automatic like that of an air compressor; uniflow scavenging; no crankshaft, therefore no rotative external power is generated; no connecting rod, no bearings and no balancing. The engine handles heavy fuels very satisfactorily.

Though this installation is for maritime use, other applications are being worked on. These include: electrical generating sets, railway locomotives, tractors, and experimental automobiles and aircraft.

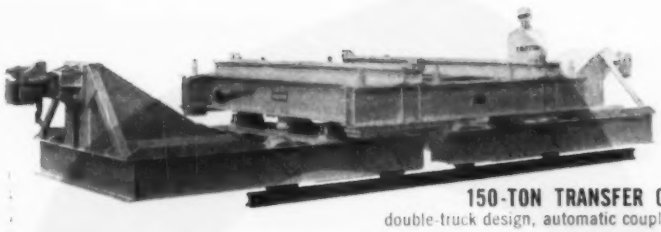
Metallurgical Delegates To Tour Canada

An important gathering of metallurgical delegates will take place in Canada during September and October of this year. Some 500 traveling representatives from all parts of the world are expected to arrive at Vancouver, on September 8, 1957, for the Sixth Commonwealth Mining & Metallurgical Congress. They will travel across Canada by planes and trains on a schedule calling for the final meeting at Halifax, N. S., on October 9.

Participating in the Sixth Congress will be constituent institutions numbering 28,000 members. These comprise the Commonwealth Council of Mining & Metallurgical Institutions. The council serves as an inter-communication between ten member organizations.

In addition to regular attenders, council officials expect delegates to attend as official representatives of government agencies and technical societies and institutions unaffiliated to the sponsoring group.

Main Purpose—Principal objective of the meeting is to provide suitable occasions and circumstances whereby metallurgists and others can discuss technical progress and problems. Equally important, though, is the personal contacts to be made by participants. So, too, is the information gained from visiting the mining and metal-



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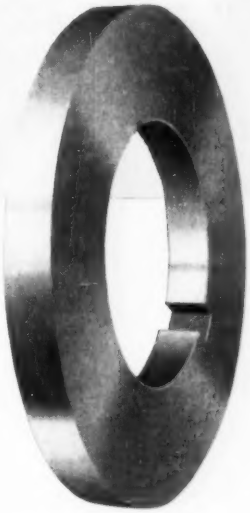
TRIMMING KNIVES



Assure more continuous production and more tonnage from each grind

Cowles knives stay on the job longer. They keep mills in continuous production with minimum downtime for knife changes. Manufactured from individually hammered forgings, and heat treated to assure maximum durability, they meet industry's most exacting requirements. Any diameter, face or bore. Widely used by all principal producers and processors. *Let us quote on your requirements!*

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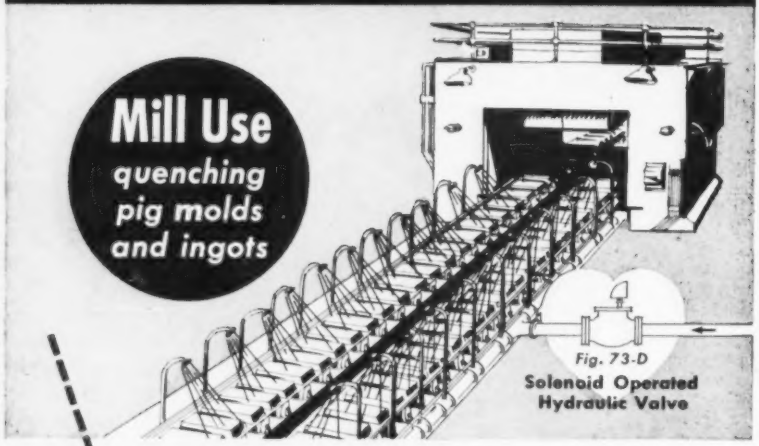

For automatic quenching of pig molds (illustrated above) or ingots, install the G-A Cushioned Solenoid-Operated Valve. This valve opens quickly, closes at adjustable speed without hammer or shock, is available either normally closed or normally open, and is actuated automatically by push button, trip switch on conveyor, or other type of limit switch.

Available in either Angle or Globe Body Pattern

Write for descriptive technical bulletin W-7A.

Golden Anderson Valve Specialty Company
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lurgical installations in the host country.

The host nation gets benefits too. Canada hopes to get a stronger mining and metallurgical position out of it. It offers a worldwide display case.

Wide Area—The congress' plans include a cross-Canada tour from Vancouver to Halifax by chartered trains. It'll encompass an aerial tour of Northern British Columbia, Yukon, Northwest Territories, Northern Saskatchewan and Northern Manitoba. Inspection visits to more than 50 major industrial centers will take in: metal mines, coal mines, smelters and refiners, petroleum and gas wells, oil refineries, chemical and petro-chemical plants and steel plants.

The Congress will undertake the publication of five technical volumes on various mineral and metals subjects.

Shock Doesn't Shatter Plastic Windows

For plants where vibration, shock and flying metal chips cause frequent window breakage, the use of plastic glazing offers one remedy. The experience of Phoenix Iron & Steel Co., Phoenixville, Pa., shows how the shatter and impact-resistance material eliminates the costly problem of repeated breakage for them.

Vulnerable points in the steel firm's plants were three supervisory mill offices. Two of these are in the seamless pipe mill; the third is in the steel fabrication shop. The pipe mill offices measure about 12 x 22 ft. They have windows on all four sides measuring about 40 x 48 in. each. In the fabrication shop the office is smaller, about 12 x 12 ft. But this has an unusually large expanse of window area extending from floor to ceiling around three sides of the structure.

Good View—Although the large

window areas provide excellent visibility to all corners of the shops, their location made them highly susceptible to breakage. Continuous vibration from heavy machinery, riveting, flying chips from castings, as well as occasional carelessness in slamming doors or jolting windows all contributed to the hazard. The

Big windows, good visibility; hazards, too—when broken.

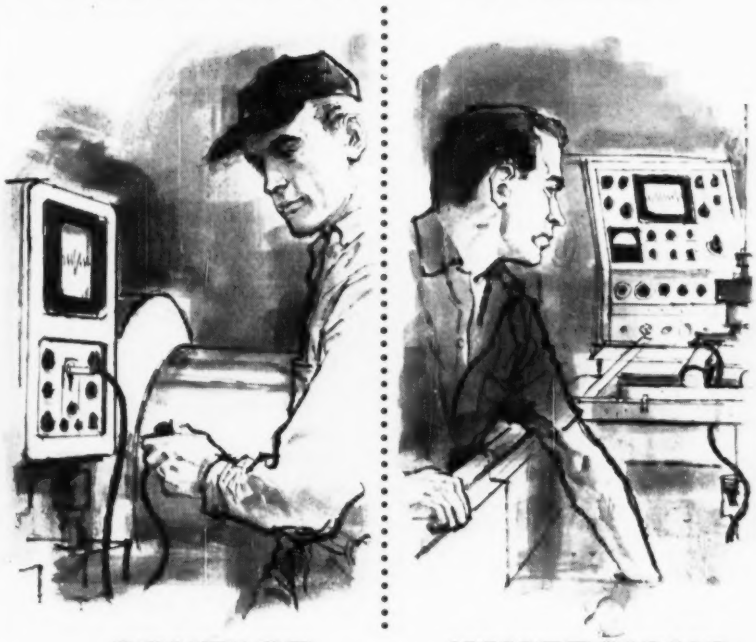
breakage rate at such locations usually runs as high as six to seven panes of glass per month.

To eliminate frequent window replacement, these offices now have ¼-in. panes of Plexiglas. This acrylic plastic, manufactured by Rohm & Haas Co., Philadelphia, is ideal for the application. Why? The material withstands substantial impact, vibration and twisting without cracking or shattering. It also is very clear. Visibility is distortion-free. It does not discolor with age, sunlight, heat or exposure to industrial atmospheres.

No Broken Panes — Installers placed acrylic glazing in the three offices at different times. The first installation was made about three years ago. To date, no breakage has occurred at this or any other shop office.

Besides improved safety for shop and office personnel, and the virtual elimination of recurrent window replacement costs, the steel company lists a third advantage. Since Plexiglas has a low thermal conductivity, there is little heat transmission through the windows. Since, these occupy nearly three quarters of the

ULTRASONIC TESTING–



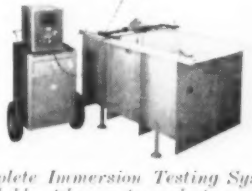
CONTACT or IMMERSION?

Either way, you're served best by the Sperry Reflectoscope

Both ultrasonic immersion and contact testing serve flawless purposes... the type to use is the one that serves your operation most effectively. The *equipment* to use to inspect your material or product for internal flaws is something we know a lot about.

The Sperry Ultrasonic Reflectoscope is admirably suited to *either* type inspection whether "tank" or "touch"... it can be used for one or the other with equally efficient results. Thus, you're not limited to one kind of testing. With the same basic equipment you could perform both immersion and contact testing if your operation required it. Or, whenever it was necessary, you could switch from one type of testing to the other. The Sperry Reflectoscope's "dual adaptability" makes it easy.

In manufacturing the Sperry Reflectoscope for both immersion and contact testing, we have acquired considerable experience in determining which type of testing is best suited to a given manufacturing operation. Should you require any assistance in this direction, we'll be only too glad to help you.



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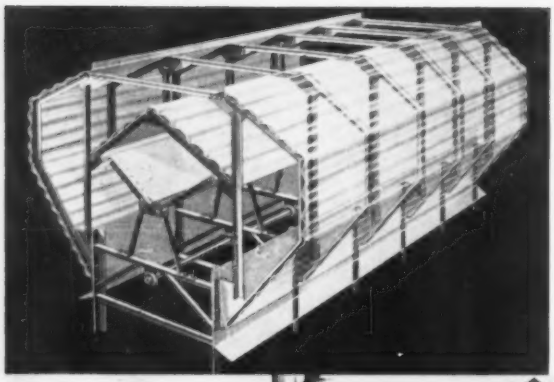
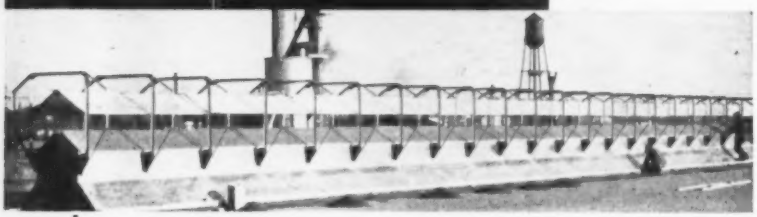


TOP — The Burt Monovent Ventilator. Sizes to 96" throat — continuous runs, as required. BELOW — Burt Monovent on The S. K. Wellman Co. plant during erection by Industrial Roofing & Sheet Metal, Inc., Cleveland. Contractor—Albert M. Higley Co., Cleveland. Engineer — Vincent Eaton, Cleveland. Architect — Charles Bacon Rowley & Associates, Inc., Cleveland.



110 FOOT BURT MONOVENT EXHAUSTS HEAT AND SMOKE from the S. K. WELLMAN COMPANY ADDITION

The S. K. Wellman Company's new 120' x 240' addition to their Bedford, Ohio, plant required highly efficient ventilation to remove smoke and heat from metallurgical processing equipment. The solution—this 110' Burt Monovent Continuous Ridge Aluminum Ventilator, with 72" roof opening quickly exhausts hot, stagnant air uniformly along the entire building. Center hinge butterfly type dampers and the fixed top form a cone-shaped airflow section that provides broad, simple air flow lines, eliminating numerous air passes and attendant friction losses. The Burt Monovent is economical to install, operate and maintain and highly efficient.

Send for **FREE** *Data Book!*

Write for Burt Data Book SPV-101-E. It supplies quick data on Burt's complete line of modern Roof Ventilators.

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The Burt Manufacturing Company

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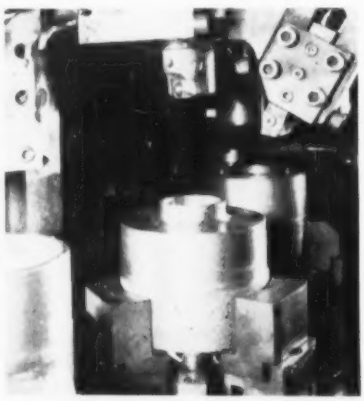
total wall area in the offices, it results in an air conditioning cost saving.

The user's maintenance crew installed the Plexiglas glazing in wooden frames using about the same method as for glass. Plexiglas can be sawed and machined with conventional woodworking tools. The major requirement for good installation is to cut the plastic sufficiently under-size to allow it to expand freely at high air temperatures.

Boring Bars, Inserts Improve Part Finish

Substituting boring bars with square throw-away inserts helps a Midwestern auto transmission plant improve the finish on its products.



Micro-adjustable throwaway insert boring bars work this piece.

Not only that; tool costs are down, too. All this without changing speed or output rate.

Model K Bullards do the machining. These work pearlitic planet pinion carrier housings of about 200 Brinell. With tooling formerly employed, keeping the two-bladed reamer properly centered was a constant problem. With only 100 pieces producable per grind, it was necessary to keep a supply of reamers on hand at the machine, in the tool crib, and in the grinding room, to prevent protracted shut-downs for tool changes.

Reduces Downtime — Adopting Wesson throw-away insert boring bars, the firm cuts shut-downs for tool changes by 75-pct. While bars are micro-adjustable, this adjustment is used only in initial setups. The use of Wessonmetal WH precision ground inserts makes adjustment practically unnecessary. When worn, the insert is simply indexed to a new edge.

Throw-aways eliminate all tool grinding, cut needed tool inventory to a small fraction of that formerly necessary. They reduce tool change time from 4 minutes to a maximum of 60 seconds. Wesson Co., Detroit, supplies the tools.

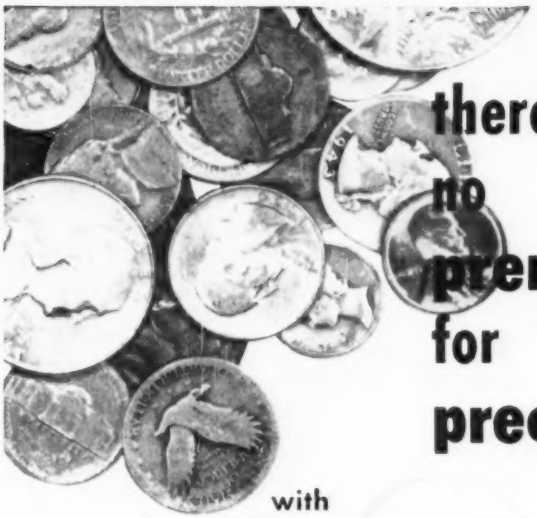
Closed-die Forges Big Crankshafts

Crankshafts weighing up to 5000 lb are produced by closed-die forging at the plant of The Park Drop Forge Co., Cleveland.

The company is now installing a new 50,000-lb capacity hammer. It also has 25 other hammers ranging from 2000 to 35,000-lb capacity. On these it produces forgings weighing from 5 to 5000 lb, using carbon, alloy, heat-resistant alloy, and stainless steels.

Few Failures—In making a lot of 3500-lb multiple throw crankshafts recently, the company started with two Heppenstall Hardtem die blocks, each 16-in. high, 31-in.

Worker checks contours of the die, made from a huge block.



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Turned from stock under basic size so they're never tight on wrenches . . .

Tapped through, eliminating "blanks" or rejects . . .

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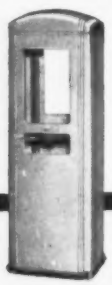

GASOLINE PUMP STAMPINGS

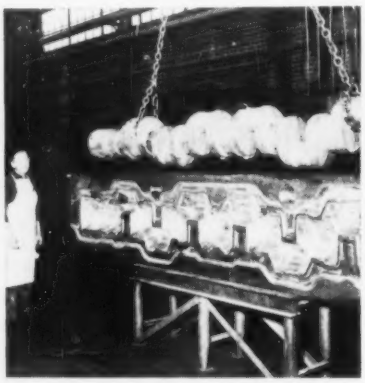
HYDRAULIC RESERVOIR

CONDENSATE PUMP TANK

TECHNICAL BRIEFS

wide, and 158-in. long, and weighing 22,518 lb each.

Many hours of precise machining were required to "sink" the



Part of the forging die is shown with the complete forging.

dies; this time would have been wasted if they failed under the heavy hammer blows. Over a period of years, however, the firm has found very few failures.

NEW BOOKS

"Analysis for Production Management" presents up-to-date analyzing methods for programming, statistical analysis and economic analysis. Specific manufacturing examples illustrate each method to show how theory relates to actual production problems. 503 pp. $7.80 per copy. Richard D. Irwin, Inc., Homewood, Ill.

"Applied Strength of Materials" is a general over-all study of various materials. It covers structures and fastening and joining techniques commonly found in machines and buildings. 343 pp. $5.75 per copy. McGraw-Hill Book Co., 330 W. 42nd St., New York 36.

"Tool Design" is a pure textbook. Prepared by G. H. LeCain and Cyril Donaldson of Rochester Institute of Technology, the book gives about as broad a picture of the field as is possible. Sometimes,

it even oversteps its boundries, going over into welding, tolerances, etc. For the beginner, it reads easily and understandably. It could even be helpful for those non-specialists who indirectly supervise designers. 557 pp. $6.75 per copy. McGraw-Hill Book Co., 330 W. 42nd st., New York 36.

"Engineering Structural Failures" basically discusses problems confronting testing and inspection men and civil engineers. It covers breakdowns in various welded structures, bridges, maritime and building structures and the like. 224 pp. $12.00 per copy. Philosophical Library, 15 E. 40th St., New York 16.

"First Helper's Manual," is a simplified text on practical open hearth steelmaking. It presents highly technical information in a clear, concise manner. Well illustrated, the book covers plant, furnaces, raw materials, basic process chemistry, making a heat and furnace maintenance. 84 pp. $3.00 per copy. Dolomitic Refractories Assn., 1279 W. Third St., Cleveland 13, Ohio.

"Reliable Electrical Connections," are discussed in 13 papers and other data contributed by 36 experts. It is based on proceedings of the second conference of the Radio-Electronics-Television Mfg. Assn. 103 pp. $5.00 per copy paperbound. Engineering Publishers, GPO Box 1151, New York 1.

"Machine Tools for Metal Cutting," by Prof. W. H. Armstrong of Pennsylvania State University, simply and lightly touches on most phases of the subject. It covers materials, tools and processes used in the machine shop only. Its biggest feature is its listing of late tools and methods. 347 pp. $5.00 per copy. McGraw-Hill Book Co., 330 W. 42nd St., New York 36.

"Motion Economy and Work Measurement" deals with time study and motion economy. 468 pp. $7.50 per copy. The Ronald Press Co., 15 E. 26th St., New York 10.

A. B. HOEFER, *Vice-President*, FREDERIC B. STEVENS, INC.

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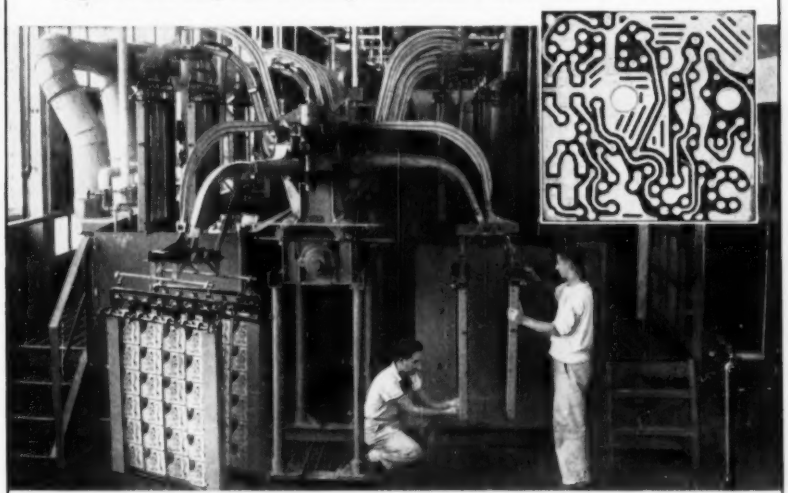
POSSIBLY ONE OF THE BIGGEST TECHNOLOGICAL ADVANCES in methods and materials for the assembly of electronic equipment is proving to be electrically conductive lines of copper, plated to uniform thicknesses on a plastic circuit board. Stevens is proud to be playing a part in this advancement. ONE LARGE MANUFACTURER IS OBTAINING 2,880 PLATED CIRCUITS an hour with a Stevens Automatic Rack Type Processing and Plating Machine. The machine carries two



Stevens Automatic Processing and Plating Machine used for copper plating circuits at General Electric Company, Auburn, New York.

racks per arm, with each rack holding twenty-four circuits in position for plating. The results, beside the high production, are uniformity and "sure-fire" conductivity.

ANOTHER ADVANTAGE OF THE PLATED CIRCUITS is the "plated through" holes or eyelets which form a mechanical bond to the circuits on both sides of the base and also eliminate connective wiring of the two circuits.

Our engineers are constantly working toward the development of new ideas in plating and metal finishing. Why not let us help you in such problems as plating, anodizing, pickling, cleaning, electro-cleaning, phosphating, stripping, lubriting and other types of immersion processing. Write Frederic B. Stevens, Inc., 1804 Eighteenth Street, Detroit 16, Michigan.

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Equipment, Methods and Services

Kit Converts Standard Gun for Spot Welding

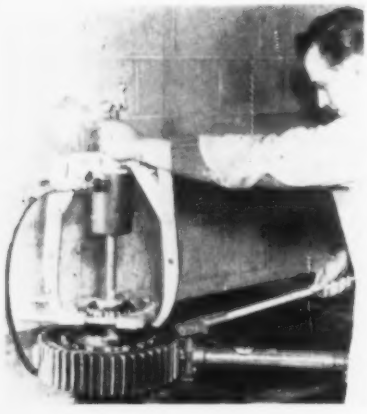
With a new kit, users of a firm's manual gas-shielded metal-arc welding guns can convert them for arc spot welding. The kit consists of an auxiliary control panel, an outer barrel and a flat nozzle. After adaption, the gun spot welds lap joints or tack welds in a butt, lap or fillet joint on mild or stainless steels. Here's how it works: operator places the gun against the work and operates the trigger. Heat of the gas-shielded arc between the work and the automatically fed filler wire then makes a circular weld. The required amount of filler wire melts off, being added to the weld for reinforcement. All operations—wire feed, weld time, pre-weld gas purge and post-weld gas and water flow—are automatically controlled. Guns rate at 350 amp continuous duty, dc reverse polarity for normal use, 500 amp dc reverse polarity for spot welding. (Air Reduction Co., Inc.)

For more data circle No. 39 on postcard, p. 121

Power Shear's Cut Doesn't Require Grinding

This power shear offers separate hold-downs for angles, flats and punch. Its cut requires no grinding. The blades and punch arrangement cut a ½-in. hole through ¼-in. material; the coper blade copes 1¼ through ⅛-in. Its standard blade cuts angles 2 x 2 x ¼-in. and will handle 4 x ¼-in. flats. The notch blade provides for either round notch for rounds up to ¾-in. or a V-cut for squares up to ¾-in. In addition, there are special blades for channel, angle iron or ornamental iron. The ornamental iron blade handles flats, squares, channels or hand-rail cuts. Either hand or foot operation of the clutch is provided. When opened, it makes 44 strokes per minute. It's made of high grade cast-iron with clutch, pin and dog made of hardened steel. All blades for use on the shear are made from tool steel. (Bateman Machine & Foundry Co.)

For more data circle No. 40 on postcard, p. 121

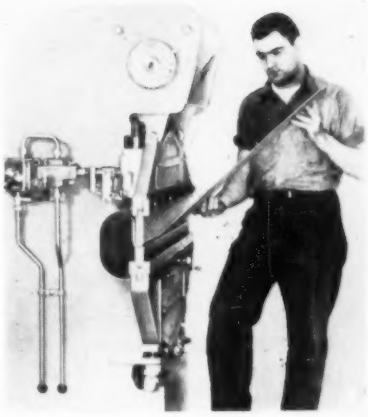


Hydraulic Ram Pulls Gears, Shafts With Ease

Here's what this hydraulic ram and puller can do: reduce machine downtime, cut labor and production costs, and save on salvage of expensive machine parts. So states its manufacturer. The hydraulic puller, one of a line, does press fitting, lifting and pressing, and production (through use of special jigs and fixtures) jobs. It'll pull gears, shafts, bushings, bearings, spoke wheels, sprockets, sheaves and other tight fitting shaft mounted parts. Complicated maintenance pulling operations which sometimes require long or extended periods of repair time are performed hydraulically with the unit, using less labor and time. Also important is the saving of expensive machine parts which are damaged when using sledging, prying, heating, chilling etc. The ram comes in 20, 30 and 60-ton capacities. (The Blackhawk Manufacturing Company.)

For more data circle No. 41 on postcard, p. 121

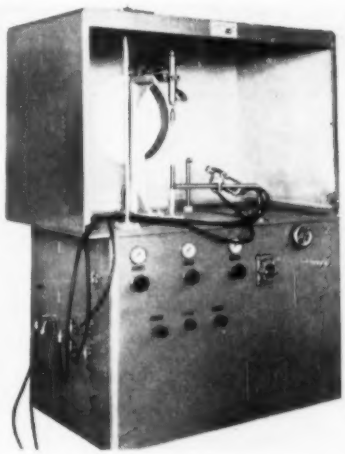
Press Brake Accessory Stops Whipping, Kinking



An accessory for hydraulically operated press brakes eliminates whipping and resultant kinking of sheet during forming. Basic element in the let-up is an adjustable flow control valve. Long sheets are handled safely and efficiently with it, its developer says, because the speed of the ram can be reduced up to 50-pct just prior to the time that the die in the ram makes contact. While the form part of the stroke is at slow speed, the return stroke is at maximum speed. The operator adjusts the let-up control on a calibrated gage. This mechanically links to a two-way valve which opens and closes to allow hydraulic oil to flow through the flow control valve. Reduction of ram speed is particularly desirable when forming long sheets because it reduces the accident hazard and makes handling easier. (O'Neil - Irwin Mfg. Co.)

For more data circle No. 42 on postcard, p. 121

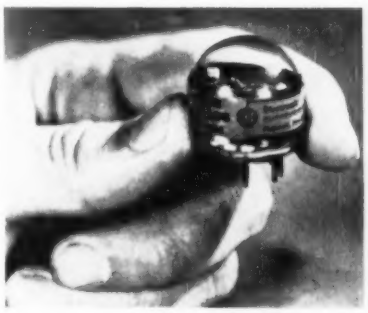
Booth Teams With Automatic Spray, Maskwasher



All in one, this unit incorporates an automatic spray decorating machine, maskwasher and spray booth. It comes ready to hook up for production. Handling long or short runs, the equipment comprises a rapid action washer for cleaning paint masks. The sturdy steel spray booth has an opening which connects with a prevailing exhaust system. It sprays many different sizes and shapes by the rotation method. This promises even paint deposit and truly uniform coating. In many cases, the work holder acts also as a mask. On a part that needs an automatic hold-down, the mask incorporates into the top-holder as well as the bottom. The setup features complete air-conditioning and automatic oiling. Its spindle rotates from 40 to 400 rpm. A dial indicates spray length. Spindle and guns stop automatically as predetermined by dial setting; a foot pedal actuates them. (Conforming Matrix Corp.)

For more data circle No. 43 on postcard, p. 121

Tiny Electronic Tube Counts to Nine



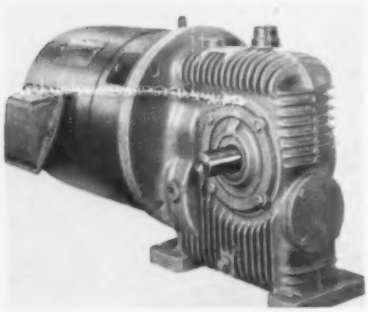
If you are looking for a tiny electronic tube that counts from zero to nine, then this is for you. The tube is a glass envelope less than 1-in. diam. It contains thin layers of transparent metallic numericals. When voltage passes through, the selected number glows. Which number appears depends on how voltage goes into the tube. The instrument is all-electronic, has no moving parts and is shock resistant. Possible uses: readout or position indicator on controls, counting on digital computers, floor or height indicators on elevators. (Burroughs Corp.)

For more data circle No. 44 on postcard, p. 121

Self-dumping Hopper Works In Narrow Aisles

Only 30-in. wide, this self-dumping hopper handles bulk materials, scrap and waste through narrow aisles and in confined areas. The hopper passes through ordinary doors with ease. It has a capacity of 10-cu ft. Mounted on three casters, the hopper can be pushed manually or transported by fork truck. A push bar at the top of the hopper aids manual movement; the single swiveled rear caster permits sharp turns around tight corners. Malleable iron and rubber tire casters are available. Pockets built into the frame permit entry of fork trucks. The hopper is heavy steel plate. Empty weight: 450 lb. Length: 49 in. Height 40 in. Standard width: 30 in. It can come narrower, though. (Roura Iron Works.)

For more data circle No. 45 on postcard, p. 121



Right-angle Gearmotor Saves User's Space

Space saving is a key feature of new right-angle gear motors with heavy load-carrying and shock-absorbing qualities. They come in 1 to 10 hp sizes for continuous-duty; 30 hp setups handle intermittent duty. Units are available with horizontal or vertical mountings, conventional double shaft, and hollow shaft. Their one-piece reducer housings are heavily finned for high strength and thermal properties; it contains a pair of helical gears for primary reduction; a double-enveloping worm gear set takes care of secondary reduction. Gearmotors come with ac or dc motors of any speed or duty rating and any standard enclosure. (Reliance Electric & Engineering Co.)

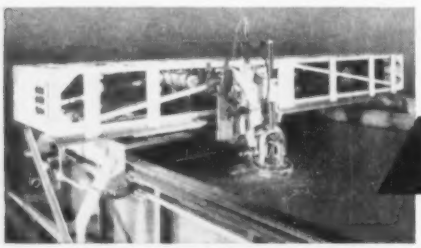
For more data circle No. 46 on postcard, p. 121

Finding the invisible with the inaudible

An engineer once said: "With ultrasonic inspection, you're finding the invisible with the inaudible."

Curtiss-Wright's Nondestructive Ultrasonic Test Equipment uses high frequency mechanical vibrations—far beyond the range of human hearing—for precision production-quantity inspection of forgings, rolled plate, welded tubing and other metal products. The "sound head"—immersed in water—sends vibrations that penetrate the metal under test and bounce back. Flaws show up on a cathode ray tube . . . and, simultaneously, a built-in alarm system sounds.

Curtiss-Wright Ultrasonic Inspection now controls quality for many leading producers in aircraft, steel, automotive, nuclear and other industries. Investigate its potentials for your production. Write for complete details.



Ultrasonic Immersion Test Equipment automatically scans wingskin plates for aircraft.

INDUSTRIAL AND SCIENTIFIC PRODUCTS DIVISION
CURTISS-WRIGHT
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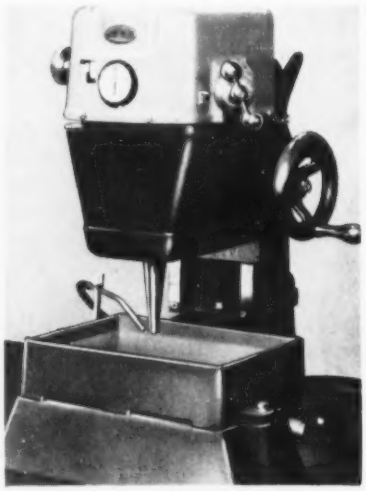
Ultrasonic Grinder

For high-precision work, this impact grinder uses ultrasonic energy to drill slice, trepan, engrave and shape hard and brittle materials. It does this to tolerances of ±0.0007-in. It finishes to 8 microinches. Machinable areas cover a range from 0.002 to 1-in. diam. The unit successfully works hard and soft steels, titanium carbide, tungsten carbide, and other materials. Designed on



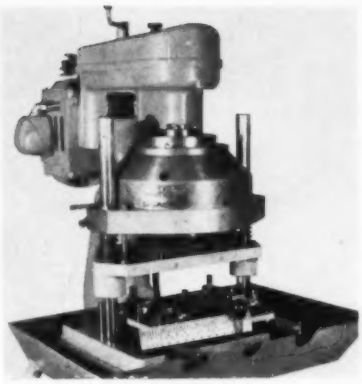
the basis of experience gained with a much larger, more costly grinder, the new unit fits the same exacting toolroom requirements. Construction features include hardened and ground steel ways, semi-steel base and pedestal castings and a heavy-gage steel-encased driver cabinet. Power source is 115-v ac; water cooling isn't required. Its weight is under 200 lb. (Raytheon Mfg. Co.)

For more data circle No. 47 on postcard, p. 121

Small Drill Presses Have Gearless Drill Head

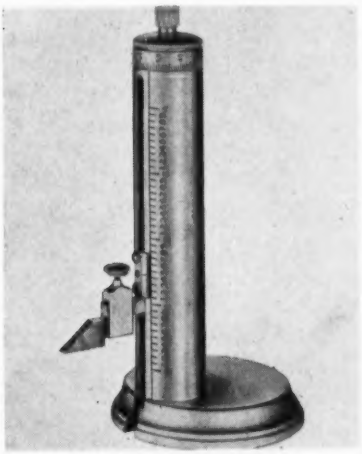
Small drill presses now use gearless drill heads. The presses are equipped with small diameter, medium duty drill heads. Their tables, which hold the parts to be drilled, move upward into the rotating drills. Table travel, feed into drills, and return travel downward of the table are automatic cycling. The table in some cases carries an index fixture. Thus, 25 spindles drill a total of 50 holes, 25 holes simultaneously in two passes. Hydraulic control actuates the table. The presses features small size (about 3-ft high), compact and self-contained operating machanisms. They adjust for height and are said to be easy to operate and maintain. Adjustable speed is optional. (Zagar, Inc.)

For more data circle No. 48 on postcard, p. 121



Gage Measures Height

With the introduction of this micro-height gage, a manufacturer now offers a choice of two gage sizes. Both are for speedy layout of metal in process and inspection of finished metal parts. The device has a 4-in. direct reading capacity

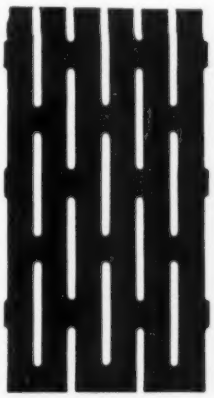


with its scriber's straight edge in the down position. By reversing this precision-ground, high-speed steel scriber in its support so that the straight edge is up, exactly 1-in. is gained, increasing the direct reading capacity to 5-in. to an accuracy of plus or minus 0.0003-in. over the complete range. (The Greist Mfg. Co.)

For more data circle No. 49 on postcard, p. 121

Unit's Heads Rotate

A new weld roll planisher features rotating heads. These rotating heads can be turned 90° and locked in position for planishing circumferential welds as well as longitudinal welds on tubes, tanks, cones and other shapes. Vise-type locks hold



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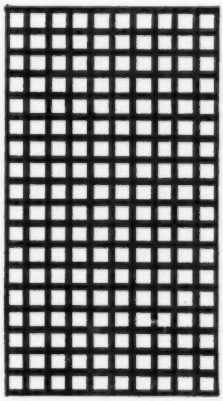

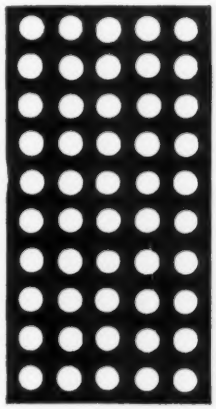

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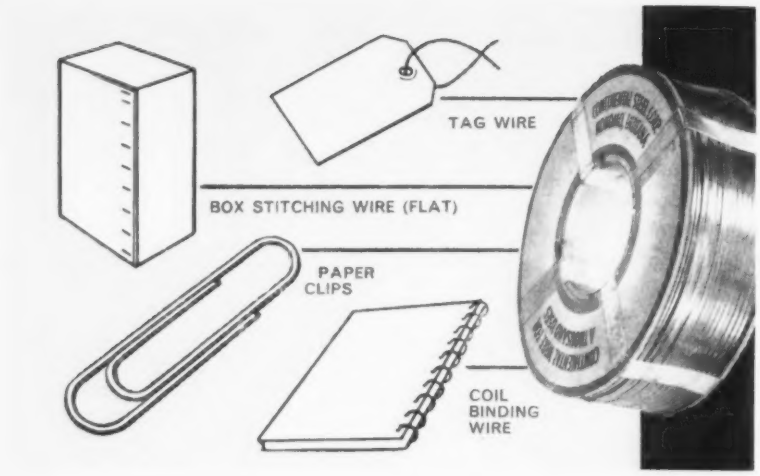
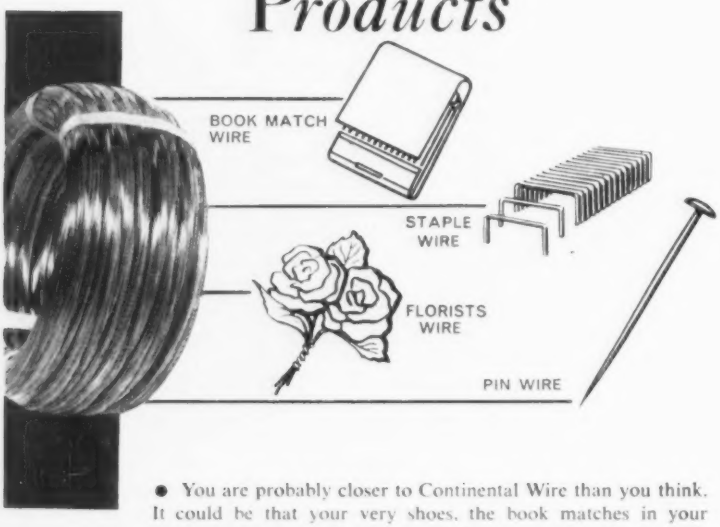


Fine and Specialty Wire for Super Fine Products



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the upper and lower heads in position. This 6½-ton planisher has a 72-in. throat. Pressures up to 10 tons and up to 96-in. throat depth are available. The upper head is power driven by geared head motor and chain drive. There are no size limitations for large diameter tubes. For small diameters, a traveling backup attachment is supplied for small tube weld roll planishing. (Airline Welding & Eng. Co.)

For more data circle No. 50 on postcard, p. 121

Paper Is Tough

Resin-transparentized, a 100-pct rag content tracing paper offers good reliability, workability. Permanence and uniformity are claimed for the paper. It has exceptional translucency. It accepts pencil hardness up to 9H without tearing or puncturing, and areas can be cleanly erased and re-erased repeatedly without damaging its drawing qualities. This paper withstands heavy handling in drawing, reproduction, and filing because of its exceptional inherent strength. Drawings made on this paper can be filed indefinitely without deterioration of the drawing. (Charles Bruning Co., Inc.)

For more data circle No. 51 on postcard, p. 121

Protective Spray

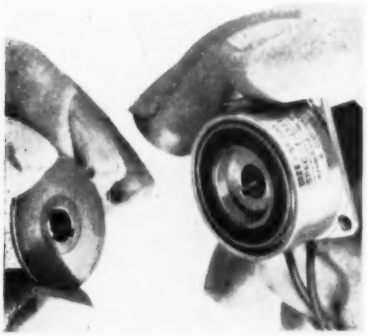
Clear and protective, a spray performs original factory treatment of bright metals and chrome surfaces.

This fast-drying spray is packed in an Aerosol bomb. The nozzle is at the bottom of the can. It is also available for large quantity usage in liquid form for spraying or brushing on. The material stays tight, smooth and easy-to-clean. (Therm-O-Glare Corp.)

For more data circle No. 52 on postcard, p. 121

Clutch Is Tiny

Electro-magnetically operated, a new miniature clutch is designed for use on low torque drive of instruments and miniaturized control mechanisms. The unit gives instan-



taneous, positive engagement and release of loads up to 2 in.-lb (static torque rating). Axial length of the unit is only ⅞ in. and diameter is 1⅛ in. (Electric Brake & Clutch Co.)

For more data circle No. 53 on postcard, p. 121

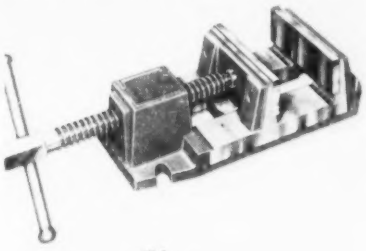
Table Sets Up Easily

Intended for use with turret drilling and tapping machines, this universal positioning table reproduces any pattern of holes within a 10½ x 12-in. rectangle. It can also be used efficiently on single spindle drill presses and radial drills. The table is easily set up and changes from one job to another simply by substituting a new hole location plate. (Howe & Fant, Inc.).

For more data circle No. 54 on postcard, p. 121

Drill Press Vise

Solid base drill press vises are available that can be turned on edge for accurate drilling at a 90° angle. Ends of the base are cut back, and the sides of the vise are machined to form a true right angle with drill press tables. The vise is only 2¾-in. high, but the jaws are a full 1¾-



in. deep. (Wilton Tool Mfg. Co., Inc.)

For more data circle No. 55 on postcard, p. 121

Deburring Tool

Tube deburring tools are now available for tubing ranging from 3/16 to 1¼-in. OD. They face the end and chamfer the inside and outside of standard tubing in one operation. Cutters and pilot reamer are replaceable. They adjust for size control and are easily reground in the user's plant. (Genesee Mfg. Co., Inc.)

For more data circle No. 56 on postcard, p. 121

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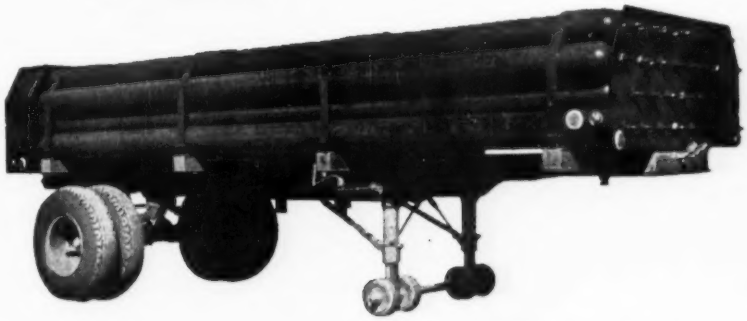

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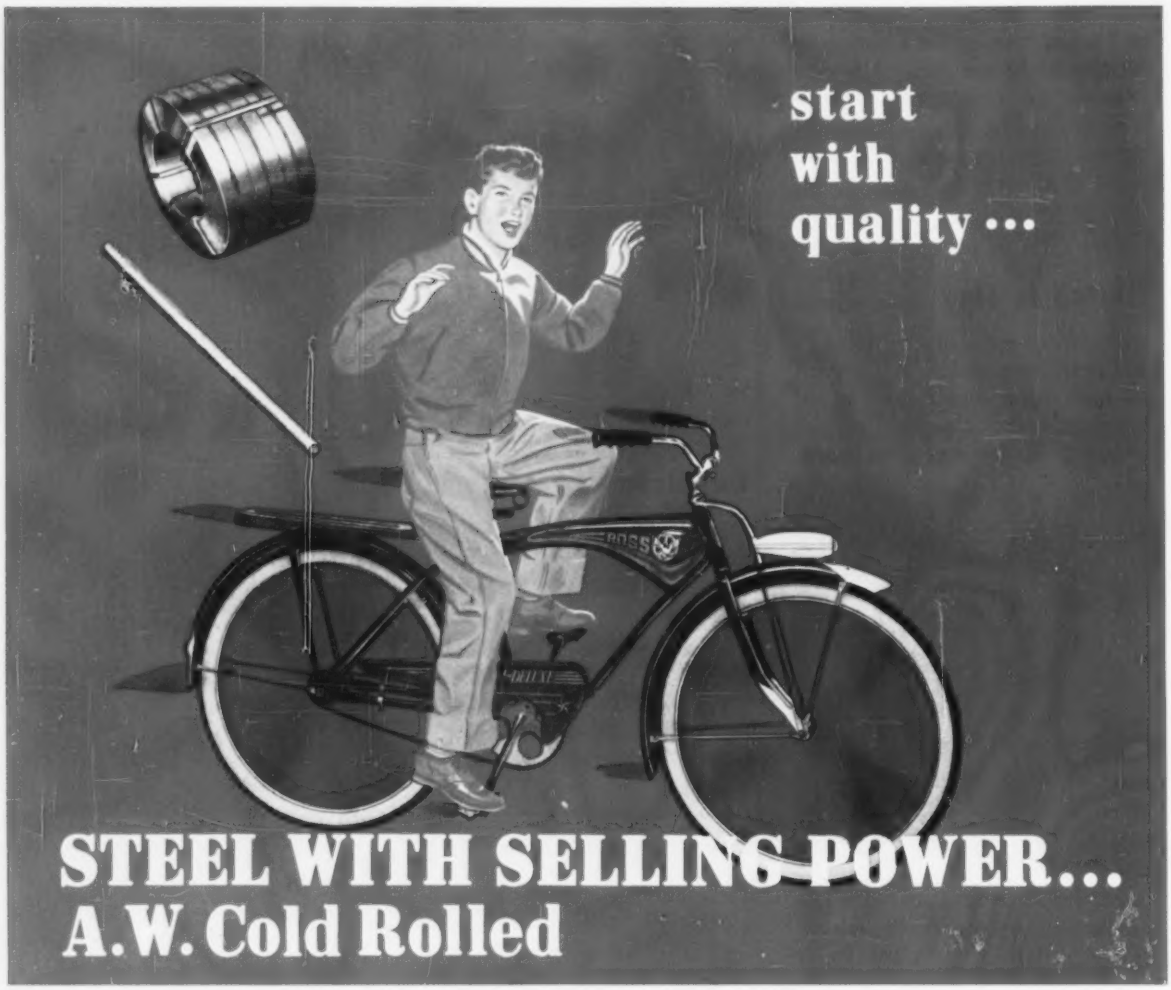

Bike experts—like the one above—demand reliability . . . and that's where Alan Wood enters the sales picture.

The tubing in this Chain Bike Corporation product is formed from Alan Wood cold rolled sheet by Berger Machine Company. The sheet delivered by Alan Wood is of excellent quality, its reliability assured by Alan Wood's product control from ore to finished product. To this, add the services of Alan Wood metallurgists—always available to give the expert assistance that has helped solve hundreds of production problems for our customers.

To the tubing manufacturer, these contributions—consistent high quality of a basic material, and service—help assure efficient production runs, cut slowdowns and rejects. The bike manufacturer gets the selling advantage of a reliable material.

To the "no hands" bike expert this all adds up to "I'm gonna tell Jimmy to get a bike just like mine. It's rugged!"

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abrasive

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MINE PRODUCTS
Iron ore concentrates
Iron powder
Crushed stone
Sand

COKE
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PENCO METAL PRODUCTS DIVISION
Steel cabinets, lockers & shelving

The Iron Age Summary

Steel Lacks Much-Needed Spark

The hoped-for pickup in automotive steel ordering still "just around the corner."

Some hedge buying against expected steel price increase will help June deliveries.

■ The steel market still lacks a much-needed shot-in-the-arm this week. A pickup in automotive and appliance ordering could provide the spark that mills have been hoping for. But these important steel users show little inclination to snap out of the doldrums.

Several midwestern mills report an encouraging pickup in automotive sheet orders for June delivery. But other mills see no particular change in the volume of orders coming from Detroit. Appliance makers are still loaded with steel and some have cut back.

Bright Spot—One bright spot in the otherwise dark sheet-strip market is the indication that some steel users may have cut their inventories to the point where they may have to re-enter the market soon. Orders for emergency delivery of sheet and strip tonnages are cropping up more frequently.

Another hopeful sign is that some companies are now talking about placing orders as a hedge against the expected steel price increase in July. These hedge orders will be nothing like those of previous years when the possibility of a steel strike provided an additional incentive. But sheet-strip mills are welcoming the windfall, however slight.

How High Is Up?—The July steel price boost will offset the scheduled wage increase effective July 1 under steel labor contracts. Estimates on how much prices will rise vary. Some steel men are plumping for a $10-a-ton increase. Others believe the rise will average about $7.50 per ton. A good bet: An average boost of between $5 to $7 per ton.

Inventory cutbacks may be closer to completion than is generally realized. Warehouses report receipt of emergency orders from steel users who normally buy in mill quantities. Mills are competing for business in some products strictly on the basis of delivery. This is forcing some mills to warehouse fairly heavy tonnages to meet customer demands for prompt delivery. Several stainless steel producers recently lost orders to competitors because they could not meet customer delivery requirements.

Scrap Firming—The steel scrap market gave additional signs of firming up this week. But there's no indication of a definite trend as yet. Price of the top melting grade rose $1 per ton in a major consuming area—the first increase since the turn of the year. Some scrap dealers are beginning to rebuild yard inventories and are resisting mill efforts to buy at lower prices.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,317	2,317	2,368	2,462
Ingot Index				
(1947-1949=100)	144.2	144.2	147.4	153.3
Operating Rates				
Chicago	86.0	88.0*	87.0	99.0
Pittsburgh	93.0	94.0*	93.0	106.0
Philadelphia	104.5	103.0	105.0	105.0
Valley	88.0	87.0	88.0	93.0
West	100.0	100.0	102.0	105.0
Buffalo	97.5	93.0	95.0	105.0
Cleveland	89.0	90.0*	94.0	106.0
Detroit	97.0	98.0	99.0	100.0
S. Ohio River	66.5	63.0*	71.0	97.0
South	95.5	95.5	99.0	96.0
Upper Ohio R.	96.0	87.0	78.0	96.0
St. Louis	93.0	99.0	99.0	97.0
Northeast	64.0	64.0	66.0	94.0
Aggregate	90.5	90.5	92.5	100.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.670	5.670	5.670	5.179
Pig Iron (Gross Ton)	$64.56	$64.56	$64.56	$60.29
Scrap, No. 1 hvy (Gross ton)	$42.17	$42.17	$45.83	$55.50
Nonferrous				
Aluminum ingot	27.10	27.10	27.10	25.90
Copper, Electrolytic	32.00	32.00	32.00	46.00
Lead, St. Louis	15.80	15.80	15.80	15.80
Magnesium ingot	36.00	36.00	36.00	34.50
Nickel, electrolytic	74.00	74.00	74.00	64.50
Tin, Straits, N. Y.	99.625	100.00*	102.00	98.875
Zinc, E. St. Louis	13.50	13.50	13.50	13.50

*Revised

Sheet Mills Roll Heavier Plate

Despite production problems, the sheet slackness forces mills into thicker product.

Meanwhile automotive sheet buyers are beginning to show a few more signs of life.

▪ Market-starved sheet producers are ignoring production problems to turn out heavier plate.

Some mills are going in for product ¾ and 1 in. thick. And the fact that its production means headaches for the mills isn't getting much attention. Because of shearing difficulties it's usually supplied to users uncut with tongue-shaped ends.

However, these same mills are still keeping a hopeful eye on the sheet market. They are taking the plate orders with understanding they could be cancelled if flat-rolled products show any renewed life.

Auto Orders Increase—And there are a few signs that automotive steel buyers may break out from behind the inventory barrier. In one market heavily concentrated in sheet a leading automaker doubled cold-rolled sheet tonnage for June over that of May. Another upped orders by about 40 pct. While the actual tonnages involved are relatively small, the trend itself is welcome news for the mills. However, appliance makers, also heavy sheet users, are still continuing to feed assembly lines from inventory.

Sheet and Strip—Despite a slight boost in automotive purchasing there's no hope of a strong market pickup until fall. As mills get ready to open third quarter order books, many still have unassigned second quarter tonnage on their hands.

Pittsburgh producers, with May and June orders shaping up about on a par with April's, are looking ahead to August and September for stronger automotive and appliance steel buying. Warehouses in the area, however, report a slight pickup in demand. Customers, with inventories reduced too low, are having to turn to the warehouses for rush orders of mill-size tonnages.

Sheet and strip buyers in the **Philadelphia** area are taking only minimum tonnages in the second quarter and being fussy about getting prompt delivery.

At **Chicago** some mill cold-rolled sheet operations are 50 pct below those of a year ago. Others are off about 20 pct. Hot-rolled sheet production, however, is at a higher level. Cold-rolled strip operations are down about 30 pct from year ago levels. Hot-rolled strip mills are busier, however, due to rolling of light plate.

Los Angeles, San Francisco, and **Seattle** warehouses are crammed with sheets.

PURCHASING AGENT'S CHECKLIST

"Administered prices" are target as Congressional committees seek steel investigation. **P. 64**

Imports threatening domestic wire products market. **P. 65**

Metalworking's sales for Farwest construction will stay high. **P. 83**

Plate and Structurals—Evidence of any market easing seems lacking and there's still strong demand for strip-mill light plate.

Pittsburgh producers report it's the customers, not the mills, who are extending their range of operating interest. **East Coast** users, in particular, are looking outside their districts for steel. One mill in the Pittsburgh market is booked through June on light plate.

A **Philadelphia** area plate producer indicates the presence of sheet-strip mill plate in the market has only made its customers shift their size requirements in ordering. They fill their light plate requirements from sheet-strip mill product and save their allotments with this mill for plate needs in ½ in. and over range.

Light plate in widths over 40 in. is still popular at **Chicago.** Bookings on the product are solid through the second quarter.

Business for heavy plate and structurals at **Detroit** is as good as ever. Light plate appears to be a little off.

Farwestern warehouses are scouting eastern areas for light plate in an effort to build inventories.

Bar—Continues sharing the slack market with flat-rolled products. At **Detroit** one mill sales office sees business at its lowest ebb in years. Only the heavier bar sizes are showing any strength at **Philadelphia.** Bars are being requested on two to three week delivery by **Chicago** customers. There are even some requests for 24-hour delivery by users of cold-finished bar.

Pipe and Tubing—Pipe welding plants are getting a major windfall in the form of the light plate being turned out on sheet mills. Plants benefiting are in **Milwaukee, Houston, Toronto, Pittsburgh** and some in **California.** However, large diameter welded pipe continues booked out of sight by the mills. Smaller sizes are available for third and fourth quarter delivery. Buttweld pipe can be had off the shelf.

COMPARISON OF PRICES

(Effective April 23, 1957)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

	Apr. 23 1957	Apr. 16 1957	Mar. 26 1957	Apr. 24 1956
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.675¢	4.675¢	4.675¢	4.325¢
Cold-rolled sheets	5.75	5.75	5.75	5.325
Galvanized sheets (10 ga.)	6.30	6.30	6.30	5.85
Hot-rolled strip	4.675	4.675	4.675	4.325
Cold-rolled strip	6.870	6.870	6.870	6.28
Plate	4.87	4.87	4.87	4.52
Plates, wrought iron	10.40	10.40	10.40	10.40
Stainl's C-R strip (No. 302)	50.00	50.00	50.00	44.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.95	$9.95	$9.95	$9.45
Tin plates, electro (0.50 lb.)	8.65	8.65	8.65	8.15
Special coated mfg. ternes	9.20	9.20	9.20	8.70
Bars and Shapes: (per pound)				
Merchant bars	5.075¢	5.075¢	5.075¢	4.65¢
Cold finished bars	6.85	6.85	6.85	5.90
Alloy bars	6.125	6.125	6.125	5.65
Structural shapes	5.00	5.00	5.00	4.60
Stainless bars (No. 302)	43.25	43.25	43.25	38.25
Wrought iron bars	11.50	11.50	11.50	11.50
Wire: (per pound)				
Bright wire	7.20¢	7.20¢	7.20¢	6.60¢
Rails: (per 100 lb.)				
Heavy rails	$5.275	$5.275	$5.275	$4.725
Light rails	6.25	6.25	6.25	5.65
Semifinished Steel: (per net ton)				
Rerolling billets	$74.00	$74.00	$74.00	$68.50
Slabs, rerolling	74.00	74.00	74.00	68.50
Forging billets	91.50	91.50	91.50	84.50
Alloy blooms, billets, slabs	107.00	107.00	107.00	96.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.80¢	5.80¢	5.80¢	5.025¢
Skelp	4.625	4.625	4.625*	4.225
Finished Steel Composite: (per pound)				
Base price	5.670¢	5.670¢	5.670¢	5.179¢

	Apr. 23 1957	Apr. 16 1957	Mar. 26 1957	Apr. 24 1956
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$68.88	$68.88	$68.88	$65.26
Foundry, Valley	65.00	65.00	65.00	60.50
Foundry, Southern Cin'ti	67.17	67.17	67.17	62.93
Foundry, Birmingham	59.00	59.00	59.00	55.00
Foundry, Chicago	65.00	65.00	65.00	60.50
Basic, del'd Philadelphia	68.38	68.38	68.38	64.48
Basic, Valley furnace	64.50	64.50	64.50	60.00
Malleable, Chicago	65.00	65.00	65.00	60.50
Malleable, Valley	65.00	65.00	65.00	60.50
Ferromanganese, cents per lb‡ 74 to 76 pct Mn base.	12.75¢	12.75¢	12.75¢	9.50¢
Pig Iron Composite: (per gross ton)				
Pig iron	$64.56	$64.56	$64.56	$60.29
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$42.50	$41.50	$44.50	$56.50
No. 1 steel, Phila. area	45.50	45.50	50.50	55.50
No. 1 steel, Chicago	*38.50*	39.50	42.50	54.50
No. 1 bundles, Detroit	34.50	34.50	40.50	53.50
Low phos., Youngstown	*42.50*	43.50	45.50	62.50
No. 1 mach'y cast, Pittsburgh	49.50	49.50	50.50	58.50
No. 1 mach'y cast, Philadel'a	55.50	55.50	55.50	56.50
No. 1 mach'y cast, Chicago	*45.50*	45.50	47.50	57.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$42.17	$42.17	$45.83	$55.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.38	$15.38	$15.38	$14.50
Foundry coke, prompt	$17.50-$19	$17.50-$19	$17.50-$19	$17.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	32.00	32.00	32.00	46.00
Copper, Lake, Conn.	32.00	32.00	32.00	46.00
Tin, Straits, New York	*99.625*†	100.00*	102.00	98.875
Zinc, East St. Louis	13.50	13.50	13.50	13.50
Lead, St. Louis	15.80	15.80	15.80	15.80
Aluminum, virgin ingot	27.10	27.10	27.10	25.90
Nickel, electrolytic	74.00	74.00	74.00	64.50
Magnesium, ingot	36.00	36.00	36.00	34.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 152→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	66.50	67.00	67.50	68.00	.....
Birmingham *R3*	58.50	59.00*	.....	.....	.....
Birmingham *W9*	58.50	59.00*	63.00	.....	.....
Birmingham *U4*	58.50	59.00*	63.00	.....	.....
Buffalo *R3*	64.50	65.00	65.50	66.00	.....
Buffalo *H1*	64.50	65.00	65.50	66.00	.....
Buffalo *W6*	64.50	65.00	65.50	66.00	.....
Chester *P2*	66.50	67.00	67.50	.....	.....
Chicago *I4*	64.50	65.00	65.00	65.50	.....
Cleveland *A5*	64.50	65.00	65.00	65.50	69.50†
Cleveland *R3*	64.50	65.00	65.00	65.50	.....
Duluth *I4*	64.50	65.00	65.00	65.50	69.50†
Erie *I4*	64.50	65.00	65.00	65.50	69.50†
Everett *M6*	66.00	66.50	67.00	.....	.....
Fontana *K1*	72.50	73.00	.....	.....	.....
Geneva, Utah *C7*	64.50	65.00	.....	.....	.....
Granite City *G2*	66.40	66.90	67.40	.....	.....
Hubbard *Y1*	.....	.....	65.00	.....	.....
Ironton, Utah *C7*	64.50	65.00	.....	.....	.....
Midland *C11*	64.50	.....	.....	.....	.....
Minnequa *C6*	66.50	67.00	67.50	68.00	.....
Monessen *P6*	64.50	.....	.....	.....	.....
Neville Is. *P4*	64.50	65.00	65.00	65.50	69.50†
N. Tonawanda *T1*	.....	65.00	65.50	66.00	.....
Sharpsville *S3*	64.50	65.00	65.00	65.50	.....
So. Chicago *R3*	64.50	65.00	65.00	.....	.....
Swedeland *A2*	66.50	67.00	67.50	68.00	.....
Toledo *I4*	64.50	65.00	65.00	65.50	.....
Troy, N. Y. *R3*	66.50	67.00	67.50	68.00	72.50
Youngstown *Y1*	.....	.....	65.00	65.50	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. * Add $1.00 for 0.31–0.69 pct phos. † Intermediate low phos. ‡ Add $1.00 for 0.31 to 0.50 pct phos.

Silvery Iron: Buffalo, *H1*, $78.50; Jackson, *J1, I4* (Globe Div.), $77.25; Niagara Falls (15.01–15.50), $99.50; Keokuk (14.01–14.50), $110.00; (15.51–16.00), $105.00. Add $1.25 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 14 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): $64.00. Add $1.00 premium for all grades silvery 6 pct to 14 pct.

STAINLESS STEEL

Base price cents per lb f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	21.25	22.75	22.25	24.25	—	26.00	38.25	31.00	35.50	—	16.00	27.75	18.25
Slabs, billets	26.00	29.00	27.00	30.25	30.75	32.00	47.50	38.50	44.75	—	20.75	—	21.00
Billets, forging	—	35.00	35.75	36.50	39.50	39.00	59.75	45.25	53.50	30.75	27.25	27.75	27.75
Bars, struct.	40.50	41.25	42.50	43.25	46.25	46.00	70.25	53.25	62.25	36.25	32.50	33.00	33.00
Plates	42.50	43.25	44.50	45.50	48.00	48.75	73.75	57.50	67.00	38.75	33.75	35.50	34.50
Sheets	46.75	47.25	49.25	50.00	—	53.25	78.25	63.00	76.25	46.50	38.75	46.50	39.25
Strip, hot-rolled	34.50	37.50	35.75	39.00	—	42.50	66.50	51.50	61.00	—	29.75	—	30.75
Strip, cold-rolled	43.25	47.25	45.75	50.00	—	53.25	78.25	63.00	76.25	46.50	38.75	46.50	39.25
Wire CF; Rod HR	—	39.25	40.25–40.50	41.00–41.25	44.00	43.75	66.75–67.00	50.50–51.00	59.25–59.50	34.50	31.00	31.50	31.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2, J3*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Philadelphia, *D5*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (plus further conversion extras); *W1*; New Bedford, Mass. (.25¢ per lb higher), *R6*; Gary, *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U3*; Washington, Pa., *J2*; McKeesport, Pa., *U1, F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O. *T5*; Ft. Wayne, *I4*; Philadelphia, *D5*; Detroit, *R5*; Gary, *U1*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago, *U1*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Philadelphia, *D5*; Vandergrift, Pa., *U1*; Gary, *U1*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*; Munhall, Pa., S. Chicago, *U1*.

Pittsburgh Increase Bolsters Market

There is still a lot of uncertainty in the market in spite of stronger prices.

But the market has the look of firming at close to present levels.

■ Bolstered by a $1 increase in prices, the market indicates it has reached a firming point.

Purchases a week ago have been backed up in some major markets with new buys at quoted prices or even higher broker buying to fill new orders.

It isn't clear whether the market will bounce back with much zest. Lower mill operating levels have the trade scared. But low generation and collection of scrap have brokers hard-pressed to cover any new business.

In addition, dealers in most markets are laying down scrap to some extent. Even so there is no great evidence of any real buildup in yards.

In spite of the boost in Pittsburgh and strengthening market elsewhere, some spot declines are still going on. Chicago is down $1.00 and remains unsteady and other markets are untested.

On the basis of the increase in Pittsburgh, which counterbalanced the Chicago decline, THE IRON AGE Composite Price remained at $42.17.

Pittsburgh — Scrap prices have edged back here, with openhearth grades moving up $1 above recent mill figures. New mill buys total around 50,000 tons and come at a time when dealers are carrying low stocks. In this situation, some brokers are offering full mill price and better to cover recent orders. The orders run for 45 days and other brokers feel they can wait out current market strength.

Chicago — The market drifted down another dollar on weak mill buying and one-shot purchases at prices below the previous market. Buyers are not indicating any interest in any large tonnages, but are hopeful that spot sales will take the market down at least another $1 in the near future. Dealers continue to lay down scrap.

Philadelphia—Last week's purchase by a large mill of No. 1 heavy melting at $46 appears to have firmed this market. Several smaller mills have followed suit. With the flurry of mill buying over, dealers are turning to the piers where two cargoes are being assembled for export.

New York—Steelmaking grades have fallen another dollar here on the basis of buying by consumers in adjacent areas. No. 1 heavy melting is now quoted at $42-$43. But brokers and dealers feel sure that any sizable new orders will be at higher prices.

Detroit—Opinion here is divided on whether the market has leveled off. Some in the trade feel that the market has reached bottom and that lack of dealer scrap will keep prices at their present level. Brokers are not as optimistic. They point to declining steel operations as an indication of a further drop. A real test will not come until late this week when bidding starts on May auto lists.

Cleveland—Prices dropped back $1 as mills in Cleveland and the Valley came into the market for small tonnages. A Cleveland mill bought No. 1 heavy melting at $39 for local scrap with up to a $3 springboard for out of town material. A Valley mill purchased No. 2 heavy melting at $37 and No. 2 bundles at $34, slightly under the previous market. Overall, the market continues listless.

St. Louis—A MOPAC list of 120 carloads of scrap, including 90 of No. 1 railroad heavy melting which brought a $1 advance, added strength to the St. Louis market. Recent declines had slowed down the movement of scrap. Borings and turnings are down $1 and cast grades are weak.

Birmingham—Brokers are having difficulty filling scrap orders because of dealer resistance. In spite of this, some brokers expect prices to be still lower when mills buy again. Electric furnace and cast markets are holding firm, but buying is limited. Export continues strong, with higher prices quoted for No. 1 steel delivered at ports.

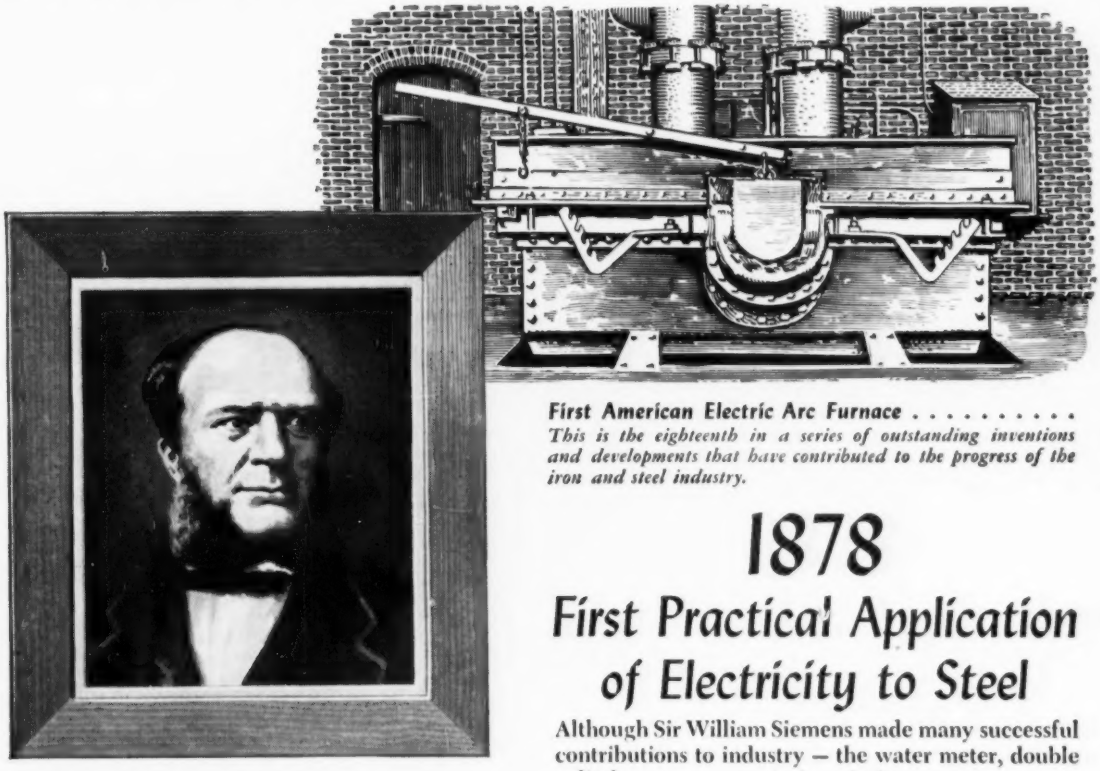
Cincinnati—The market is in a month-end lull with not too much change expected. High water on the river is curtailing shipments. Barges usually ride below dock level permitting trucks to dump directly, but high water makes expensive cranes necessary.

Buffalo—Prices of No. 1 cupola cast and No. 1 machinery cast slipped $2 a ton on the basis of sales. Low phos is also off on the basis of scattered small sales.

Boston—Prices of No. 1 steelmaking grades are off $1 on the basis of scattered small sales. Otherwise, the market is quiet with prices unchanged.

West Coast—Prices are on the weak side along most of the coast. Steelmaking grades are down $3 in Seattle. There's talk of a general drop of that extent spreading to the other markets, which are already weak.

GREAT MOMENTS IN THE HISTORY OF IRON AND STEEL MAKING



Sir William Siemens

First American Electric Arc Furnace . . . . . .
This is the eighteenth in a series of outstanding inventions and developments that have contributed to the progress of the iron and steel industry.

1878

First Practical Application of Electricity to Steel

Although Sir William Siemens made many successful contributions to industry – the water meter, double cylinder pump, anastatic printing process, among others – his most important effort was the first practical application of electricity to the melting of steel.

Ironically, his associates, while recognizing the value of his theory, did not share his confidence. Said one, "His electric furnace, although it has not as yet, and possibly never may become a practical appliance, is yet of much interest . . ."

That it has become a "practical appliance" is given full testimony by the companies which in 1956 produced a total of 9,147,567 net tons of the finest steel by the electric arc furnace process.

Commercially, Siemens' furnace did not work out. Electric current in those days was too expensive. But he laid the groundwork for the later developments of other inventors, particularly Heroult, who saw his first electric arc furnace installed in America in 1906.

Approximately 98 percent of the charge used in electric furnaces is scrap. This scrap requires known analysis – a problem we are more than qualified to solve because of our experience, personnel, equipment, and the strategic location of our offices. We would like to put our facilities to work for you.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

SCRAP PRICES *(Effective April 23, 1957)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	42.00 to 43.00
No. 1 factory bundles	47.00 to 48.00
No. 2 bundles	35.00 to 36.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and ms. turn.	27.00 to 28.00
Shoveling turnings	31.00 to 32.00
Cast iron borings	31.00 to 32.00
Low phos. punch'gs plate	47.00 to 48.00
Heavy turnings	38.00 to 39.00
No. 1 RR. hvy. melting	46.00 to 47.00
Scrap rails, random lgth.	59.00 to 60.00
Rails 2 ft and under	62.00 to 63.00
RR. steel wheels	56.00 to 57.00
RR. spring steel	56.00 to 57.00
RR. couplers and knuckles	56.00 to 57.00
No. 1 machinery cast.	50.00 to 51.00
Cupola cast.	43.00 to 44.00
Heavy breakable cast.	41.00 to 42.00

Chicago

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	39.00 to 40.00
No. 1 factory bundles	44.00 to 45.00
No. 2 bundles	32.00 to 33.00
No. 1 busheling	38.00 to 39.00
Machine shop turn.	22.00 to 23.00
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	24.00 to 25.00
Low phos. forge crops	51.00 to 52.00
Low phos. punch'gs plate	46.00 to 47.00
Low phos. 3 ft and under	46.00 to 47.00
No. 1 RR. hvy. melting	45.00 to 47.00
Scrap rails, random lgth.	52.00 to 53.00
Rerolling rails	55.00 to 56.00
Rails 2 ft and under	55.00 to 56.00
Locomotive tires cut	51.00 to 52.00
Cut bolsters & side frames	49.00 to 50.00
Angles and splice bars	54.00 to 55.00
RR. steel car axles	69.00 to 70.00
RR. couplers and knuckles	48.00 to 49.00
No. 1 machinery cast.	44.00 to 45.00
Cupola cast.	38.00 to 39.00
Heavy breakable cast.	37.00 to 38.00
Cast iron brake shoe	38.00 to 39.00
Cast iron wheels	46.00 to 47.00
Malleable	53.00 to 54.00
Stove plate	38.00 to 39.00
Steel car wheels	50.00 to 51.00

Philadelphia Area

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	36.00 to 38.00
No. 1 dealer bundles	45.00 to 46.00
No. 2 bundles	35.00 to 36.00
No. 1 busheling	45.00 to 46.00
Machine shop turn.	31.00 to 32.00
Mixed bor. short turn.	33.00 to 34.00
Cast iron borings	33.00 to 34.00
Shoveling turnings	35.00 to 36.00
Clean cast chem. borings	39.00 to 40.00
Low phos. 5 ft and under	52.00 to 53.00
Low phos. 2 ft and under	53.00 to 54.00
Low phos. punch'gs	53.00 to 54.00
Elec. furnace bundles	49.00 to 50.00
Heavy turnings	41.00 to 42.00
RR. steel wheels	57.00 to 58.00
RR. spring steel	57.00 to 58.00
Rails 18 in. and under	65.00 to 66.00
Cupola cast	43.00 to 44.00
Heavy breakable cast.	53.00 to 54.00
Cast iron car wheels	57.00 to 58.00
Malleable	61.00 to 62.00
Unstripped motor blocks	37.00 to 38.00
No. 1 machinery cast.	55.00 to 56.00

Cleveland

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 dealer bundles	38.00 to 39.00
No. 1 factory bundles	43.50 to 44.50
No. 2 bundles	30.00 to 31.00
No. 1 busheling	38.00 to 39.00
Machine shop turn.	24.00 to 25.00
Mixed bor. and turn.	27.50 to 28.50
Shoveling turnings	27.50 to 28.50
Cast iron borings	27.50 to 28.50
Cut struct'r'l & plates, 2 ft & under	45.00 to 46.00
Drop forge flashings	38.00 to 39.00
Low phos. punch'gs, plate	39.00 to 40.00
Foundry steel, 2 ft & under	43.00 to 44.00
No. 1 RR. heavy melting	44.00 to 45.00
Rails 2 ft and under	66.00 to 67.00
Rails 18 in. and under	67.00 to 68.00
Railroad grate bars	32.00 to 33.00
Steel axle turnings	30.00 to 31.00
Railroad cast.	53.00 to 54.00
No. 1 machinery cast.	51.00 to 52.00
Stove plate	48.00 to 49.00
Malleable	54.00 to 55.00

Youngstown

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	33.00 to 34.00
Machine shop turn.	22.00 to 23.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. plate	42.00 to 43.00

Buffalo

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 busheling	41.00 to 42.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	32.00 to 33.00
Machine shop turn.	26.00 to 27.00
Mixed bor. and turn.	27.00 to 28.00
Shoveling turnings	31.00 to 32.00
Cast iron borings	27.00 to 28.00
Low phos. plate	44.00 to 45.00
Scrap rails, random lgth.	56.00 to 57.00
Rails 2 ft and under	60.00 to 61.00
RR. steel wheels	49.00 to 50.00
RR. spring steel	49.00 to 50.00
RR. couplers and knuckles	49.00 to 50.00
No. 1 machinery cast.	44.00 to 45.00
No. 1 cupola cast.	40.00 to 41.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	34.00 to 35.00
Drop forge flashings	34.00 to 35.00
Machine shop turn.	20.00 to 21.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Low phos. punch'gs, plate	34.00 to 35.00
No. 1 cupola cast.	46.00 to 47.00
Heavy breakable cast.	42.00 to 43.00
Stove plate	43.00 to 44.00
Automotive cast.	52.00 to 53.00

St. Louis

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	32.00 to 33.00
Machine shop turn.	22.00 to 23.00
Cast iron borings	24.00 to 25.00
Shoveling turnings	24.00 to 25.00
No. 1 RR. hvy. melting	45.00 to 46.00
Rails, random lengths	48.00 to 49.00
Rails 18 in. and under	58.00 to 59.00
Locomotive tires uncut	50.00 to 51.00
Angles and splice bars	54.00 to 55.00
Std. steel car axles	67.00 to 68.00
RR. specialties	50.00 to 51.00
Cupola cast	41.00 to 42.00
Heavy breakable cast.	35.00 to 36.00
Cast iron brake shoes	36.00 to 37.00
Stove plate	36.00 to 37.00
Cast iron car wheels	43.00 to 44.00
Rerolling rails	58.00 to 59.00
Unstripped motor blocks	35.00 to 36.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	28.00 to 29.00
No. 1 busheling	35.00 to 36.00
Elec. furnace, 3 ft & under	38.00 to 39.00
Machine shop turn.	20.00 to 21.00
Mixed bor. and short turn.	23.00 to 24.00
Shoveling turnings	24.00 to 25.00
Clean cast. chem. borings	28.00 to 29.00
No. 1 machinery cast.	42.00 to 43.00
Mixed cupola cast.	34.00 to 35.00
Heavy breakable cast.	42.00 to 43.00
Stove plate	32.00 to 33.00
Unstripped motor blocks	26.00 to 27.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	32.00 to 33.00
No. 2 dealer bundles	29.00 to 30.00
Machine shop turn.	23.00 to 24.00
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	26.00 to 27.00
Clean cast chem. borings	30.00 to 31.00
No. 1 machinery cast.	43.00 to 44.00
Mixed yard cast.	38.00 to 39.00
Charging box cast.	43.00 to 44.00
Heavy breakable cast.	43.00 to 44.00
Unstripped motor blocks	30.00 to 31.00

Birmingham

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 dealer bundles	39.00 to 40.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	27.00 to 28.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	27.00 to 28.00
Electric furnace bundles	43.00 to 44.00
Bar crops and plate	46.00 to 47.00
Structural and plate, 2 ft.	44.00 to 45.00
No. 1 RR. hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	48.00 to 49.00
Rails, 18 in. and under	53.00 to 54.00
Angles & splice bars	52.00 to 53.00
Rerolling rails	58.00 to 59.00
No. 1 cupola cast.	48.00 to 49.00
Stove plate	47.00 to 48.00
Charging box cast.	34.00 to 35.00
Cast iron car wheels	37.00 to 38.00
Unstripped motor blocks	38.00 to 39.00
Mashed tin cans	15.00 to 16.00
Elec. furnace, 2 ft & under	42.00 to 43.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	28.00 to 29.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	23.00 to 24.00
Low phos. 18 in. & under	48.00 to 49.00
Rails, random lengths	53.00 to 54.00
Rails, 18 in. and under	63.00 to 64.00
No. 1 cupola cast.	43.00 to 44.00
Hvy. breakable cast.	43.00 to 44.00
Drop broken cast.	55.00 to 56.00

San Francisco

No. 1 hvy. melting	....	$51.00
No. 2 hvy. melting	....	46.00
No. 1 dealer bundles	....	50.00
No. 2 bundles	....	38.00
Machine shop turn.	....	35.00
Cast iron borings	33.00 to	35.00
No. 1 RR. hvy. melting	....	51.00
No. 1 cupola cast.	....	57.00

Los Angeles

No. 1 hvy. melting	....	$51.00
No. 2 hvy. melting	....	46.00
No. 1 dealer bundles	....	50.00
No. 2 bundles	....	36.00
Machine shop turn.	....	35.00
Shoveling turnings	....	37.00
Cast iron borings	....	34.00
Elec. furn. 1 ft. and under (foundry)	....	62.00
No. 1 RR. hvy. melting	....	51.00
No. 1 cupola cast.	$53.00 to	54.00

Seattle

No. 1 hvy. melting	....	$48.00
No. 2 hvy. melting	....	42.00
No. 2 bundles	....	30.00
No. 1 cupola cast.	....	52.00
Mixed yard cast.	....	52.00

Hamilton Ont.

No. 1 hvy. melting	....	$43.00
No. 2 hvy. melting	....	38.00
No. 1 dealer bundles	....	43.00
No. 2 bundles	....	32.00
Mixed steel scrap	....	40.00
Busheling	....	34.00
Bush., new fact., prep'd	....	43.00
Bush., new fact., unprep'd	....	37.00
Machine shop turn.	....	22.00
Short steel turn.	....	30.00
Mixed bor. and turn.	....	24.00
Rails, rerolling	....	54.00
Cast scrap	....	50.00

Chaucer's Sheffield Whittle

In 14th Century England, Sheffield was already famous for its fine cutlery. Geoffrey Chaucer, diplomat, business man and renowned poet, wrote of the "Sheffield Whittle" as being in common use—more than six hundred years ago.

Today, knives for "whittling," for industry, for agriculture, for the military, are required in millions of units—just one of the nation's numerous demands for steel. To fulfill these demands, a never failing flow of scrap is indispensable.

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Lead, Zinc Output Headed Up

Government official includes Russia and satellites in report on world zinc and lead output.

Expect production of both metals to be up from 1956, continue to exceed consumption.

Russia trails U. S. in output of both lead and zinc.

▪ World production of slab zinc in 1957 should reach a record 3,141,000 tons, up 59,000 tons over 1956.

World smelter output of lead in 1957 will probably be about 2,328,000 tons, 27,000 tons more than the previous year.

This is what Richard H. Mote, chief of the branch of base metals, U. S. Bureau of Mines, told the opening session of the American Zinc Institute, and Lead Industries Assn. meeting in Chicago this week.

Enough Metal—This, concludes Mr. Mote, should be "adequate to meet all foreseeable needs." Output will continue to exceed consumption. The stockpiling program and barter transactions of the U. S. government will be the "important elements," says chief of the branch of base metals.

An interesting factor in Mr. Mote's report of world supply of lead and zinc is the fact that Russia and its satellite countries are included. The reason: Zinc and lead are being exported from the Soviet sphere to Western European markets.

Little From Russia—Mr. Mote points out that far less is known of activities behind the Iron Curtain than in other countries. But on the basis of what he presents, it doesn't seem that Russia will sell much on world markets, at least not in 1957.

Russian zinc metal output in 1957 is estimated at about 330,000 tons. Even adding expected output of 170,000 tons from Poland and, 25,000 tons from Czechoslovakia, Rumania and China, it will be just over half the expected 1 million tons U. S. will produce.

Less Lead—The U.S.S.R. is expected to produce 255,000 tons of lead in 1957. In Russia's sphere of influence—Poland will produce 24,000 tons, Rumania about 12,000 tons, East Germany about 33,000 tons and China 33,000 tons. This does not begin to approach the 550,000 tons Mr. Mote says will be produced in the U. S. in 1957.

Self Sufficient—According to Mr. Mote, outlook is that Russia will produce enough zinc and lead for internal requirements, with a little left over for export. This is likely to be high cost metal, and will have little or no impact on world markets. The paramount objective of the Soviet industry is self sufficiency without regard to production costs, concludes Mr. Mote.

Copper

Two brass mills, with product lines differing sharply from one another, report business is definitely better.

Scovill Manufacturing Co., Waterbury, Conn., says sales dollar volume in the first quarter 1957 was up substantially from the third and fourth quarters of 1956. This is particularly impressive since the price of copper, and Scovill's products, was as much as 8¢ per lb higher in the smaller earnings periods. Scovill turns out sheet, rod, wire, tube, forgings, and hot die pressings of brasses and bronzes.

Reading Tube Corp., New York, specializing in copper and brass pipe and tubing, said business in the first quarter was unsettled, but was up sharply in March, and even more so in April.

Dividends

Despite the pessimism evident in almost all nonferrous fields during the first quarter 1957, it was a good period for stockholders. Office of Business Economics, U. S. Commerce Dept. reports cash dividends declared by nonferrous metal producers during this period totaled $70.5 million, up from the $69.4 million paid in the first quarter 1956. This is an increase of about 1.6 pct but slightly under the total corporate increase of 2.5 pct.

Aluminum

The Aluminum Assn. reports shipments of sheet, plate and foil were off in February. However, considering the short month, it appears the level of business of January was maintained.

Shipments of plate and sheet:

Primary Prices

(cents per lb)	Current price	last price	date of change
Aluminum ingot	27.10	25.90	8/10/56
Aluminum pig	25.00	24.00	8/10/56
Copper (E)	32.00	34.00	2/18/57
Copper (CS)	31.00	31.50-31.00	4/12/57
Copper (L)	32.00	34.00	2/19/57
Lead, St. L.	15.80	16.30	1/13/56
Lead, N. Y.	16.00	16.50	1/13/56
Magnesium ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	250-275	270-330	12/4/56
Zinc, E. St. L.	13.50	13.00	1/6/56
Zinc, N. Y.	14.00	13.50	1/6/56

ALUMINUM: 99% ingot frt allwd. **COPPER:** (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. **LEAD:** common grade. **MAGNESIUM:** 99.8% pig. Velasco, Tex. **NICKEL:** Port Colbourne, Canada. **ZINC:** prime western. **TIN:** see next page; other primary prices, pg. 148.

February — 100,150,000 lb (76,342,000 lb non heat treatable, 23,808,000 lb heat treatable); January —115,115,000 lb (87,995,000 lb non heat treatable, 27,120,000 lb heat treatable).

Shipments of foil: February—13,405,764 lb; January—15,554,670 lb.

Tin

The market was very quiet, primarily because there was no trading on Good Friday and Easter Monday. But traders say the market has been relatively quiet anyhow. Most look for a perceptable increase in buying very soon, accompanied by a higher price for spot tin. The reason: Traders say many consumers, especially the smaller ones, are working off inventories because of a lack of confidence in business conditions.

But traders predict they will have to come in for sizable tonnages before long. This is a periodic thing, which occurs everytime business does not get off to a flying start.

Tin Agreement—On the effect the change in International Tin Agreement buffer stock buying policy has had on the U. S. market, Nathan Trotter & Co., New York trader, points out, ". . . before the buffer flooring was raised the low for 3 months tin in New York was 95⅝¢ per lb (March 11). Today (April 16) it is about 99¢."

On the long term tin picture, this same trader says in the last four years world consumption of tin has increased 23,800 long tons per year while world production has fallen off by 6,100 long tons.

The statistics:

	Production	Consumption
1953	174,700	132,600
1954	179,000	140,100
1955	170,100	150,900
1956	168,600	156,400

Tin prices for the week: April 17—100.0; April 18—100.0; April 22—99.625; April 23—99.625.*

*Estimate.

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NONFERROUS PRICES *(Effective April 23, 1957)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.061	.136-.249	.250-3.
1100, 1100, 3003	44.3	42.1	40.9	40.2
5052	51.8	46.8	45.1	42.9
6061-0	48.9	44.6	42.8	42.6

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8	42.7-44.4	57.6-61.1
12-14	43.4-44.8	58.4-62.7
24-26	46.4-46.9	68.7-73.1
36-38	54.8-55.4	91.5-94.9

Screw Machine Stock—2011-T-3

Size*	¼	5/16-5/8	¾-1	1¼-1½
Price	59.7	58.8	57.4	55.2

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.352	$1.803	$2.254	$2.704
.024 gage	1.686	2.252	2.815	3.378

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250-3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

Factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	133
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included on 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	54.13	.....	51.36	54.32
Brass, 70/30	47.52	48.06	47.46	50.43
Brass, Low	50.20	50.74	50.14	53.01
Brass, R L	51.14	51.68	51.08	53.95
Brass, Naval	51.69	.....	46.00	55.10
Munts Metal	49.79	.....	45.60	.....
Comm. Bs.	52.63	53.17	52.57	55.19
Mang. Bz.	55.43	.....	49.53	.....
Phos. Bz. 5%	73.17	.....	73.67	.....

Free Cutting Brass Rod $37.68

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $11.00-$12.10; alloy, $14.75; Plate, HR, commercially pure, $9.25-$9.75; alloy, $11.25. Wire, rolled and/or drawn, commercially pure, $8.50-$9.00; alloy, $11.00; Bar, HR or forged, commercially pure, $7.10-$7.35; alloy, $7.10-$7.30; billets, HR, commercially pure, $6.85-$7.10; alloy, $6.85-$7.05.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Antimony, American, Laredo, Tex... 33.50
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb cont'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9%, small lots ..... $ 4.55
Chromium, 99.8% metallic basis ... $ 1.31
Cobalt, 97-99% (per lb) .... $2.00 to $2.07
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $48.50-$53.50
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9% dollars per troy oz... $ 2.25
Iridium, dollars per troy oz.... $90 to $100
Lithium, 98% ..... $11.00 to $14.00
Magnesium, sticks, 100 to 500 lb... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $255 to $257
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 71.25
Palladium, dollars per troy oz... $23 to $24
Platinum, dollars per troy oz.... $92 to $95
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg. $43.00
Uranium, normal per kg. $40.00
Vanadium ..... $ 3.45
Zirconium sponge $10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 31.50
No. 120 ..... 30.00
No. 123 ..... 28.50
80-10-10 ingot
No. 305 ..... 35.50
No. 315 ..... 33.50
88-10-2 ingot
No. 210 ..... 43.25
No. 215 ..... 40.00
No. 245 ..... 35.50
Yellow ingot
No. 405 ..... 25.25
Manganese bronze
No. 421 ..... 28.50

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 24.50-25.50
0.60 copper max. 24.25-25.25
Piston alloys (No. 122 type) .. 22.25-23.50
No. 12 alum. (No. 2 grade) ... 22.00-23.00
108 alloy 22.00-23.00
195 alloy 24.00-25.50
13 alloy (0.60 copper max.) ... 24.25-25.25
AXS-679 ..... 22.00-23.00

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 23.00-23.75
Grade 2—92-95% 21.50-22.00
Grade 3—90-92% 20.50-21.50
Grade 4—85-90% 19.75-20.75

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	28	27¼
Yellow brass	21⅞	20⅛
Red brass	25	24¼
Comm. bronze	25⅞	25⅛
Mang. bronze	20½	19¾
Yellow brass rod ends	21⅝	....

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 26¾
No. 2 copper wire 25⅛
Light copper 23
*Refinery brass 24¼
Copper bearing material 23¾
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 26¾
No. 2 copper wire 25¼
Light copper 23
No. 1 composition 23¼
No. 1 comp. turnings 22¾
Hvy. yellow brass solids 17
Brass pipe 19
Radiators 18
Aluminum
Mixed old cast ..... 13½—14
Mixed new clips ..... 15½—16
Mixed turnings, dry ..... 14½—15

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 24 —24¼
No. 2 copper wire ..... 22½—23
Light copper ..... 20¾—21¼
Auto radiators (unsweated) .. 15¾—16
No. 1 composition ..... 21 —21½
No. 1 composition turnings ... 20½—21
Cocks and faucets ..... 16½—17
Clean heavy yellow brass .... 14½—15
Brass pipe ..... 17 —17½
New soft brass clippings .... 19 —19½
No. 1 brass rod turnings .... 16¼—16½

Aluminum

Alum. pistons and struts .... 5½— 6
Aluminum crankcases ..... 10½—11
1100 (2S) aluminum clippings 13½—14
Old sheet and utensils ..... 10½—11
Borings and turnings ..... 6½— 7
Industrial castings ..... 10½—11
2024 (24S) clippings ..... 12 —12½

Zinc

New zinc clippings ..... 6½— 7
Old zinc ..... 4½— 5
Zinc routings ..... 2½— 2¾
Old die cast scrap ..... 2¼— 2½

Nickel and Monel

Pure nickel clippings ..... $1.15-$1.25
Clean nickel turnings ..... $1.10-$1.15
Nickel anodes ..... $1.15-$1.25
Nickel rod ends ..... $1.15-$1.25
New Monel clippings 50-55
Clean Monel turnings 45-50
Old sheet Monel 50-55
Nickel silver clippings, mixed. 21
Nickel silver turnings, mixed. 18

Lead

Soft scrap lead ..... 12 —12½
Battery plates (dry) ..... 6½— 6¾
Batteries, acid free ..... 3¾— 4

Miscellaneous

Block tin ..... 75 —76
No. 1 pewter ..... 59 —60
Auto babbitt ..... 39 —40
Mixed common babbitt ..... 12 —12½
Solder joints ..... 17½—18
Siphon tops 42
Small foundry type ..... 14¼—14½
Monotype ..... 14 —14½
Lino. and stereotype ..... 13 —13½
Electrotype ..... 12¼—12¾
Hand picked type shells ..... 9½—10
Lino. and stereo. dross ..... 4¾— 5
Electro. dross ..... 4 — 4¼

STEEL PRICES

(Effective April 28, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b., mill in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$107.00 *B3*		5.05 *B3*	7.40 *B3*	5.05 *B3*						
	Buffalo, N. Y.	$74.00 *B3, R3*	$91.50 *B3, R3*	$107.00 *B3, R3*	5.90 *B3*	5.05 *B3*	7.40 *B3*	5.05 *B3*	4.675 *B3, R3*	6.85 *R7*	6.95 *B3*			
	Claymont, Del.													
	Harrison, N. J.													14.55 *C11*
	Conshohocken, Pa.		$96.50 *A2*	$114.00 *A2*					4.725 *A2*	6.90 *A2*	6.95 *A2*			
	New Bedford, Mass.									7.30 *R6*				
	Johnstown, Pa.	$74.00 *B3*	$91.50 *B3*	$107.00 *B3*		5.05 *B3*	7.40 *B3*							
	Boston, Mass.									7.40 *T8*				14.90 *T8*
	New Haven, Conn.									7.30 *D1*				
	Baltimore, Md.									6.85 *T8*				
	Phoenixville, Pa.					5.85 *P2*		5.85 *P2*						
	Sparrows Pt., Md.								4.675 *B3*		6.95 *B3*			
	Bridgeport, Wallingford, Conn.	$79.00 *N8*	$96.50 *N8*	$107.00 *N8*						7.30 *W1* 6.95 *N8*				
	Pawtucket, R. I. Worcester, Mass.									7.48 *A5, N7*				14.90 *N7*
MIDDLE WEST	Alton, Ill.								4.875 *L1*					
	Ashland, Ky.								4.675 *A7*					
	Canton-Massillon, Dover, Ohio		$94.00 *R3*	$107.00 *R3, T5*						6.85 *G4*		10.10 *G4*		14.55 *G4*
	Chicago, Ill. Franklin Park, Ill. Evanston, Ill.	$74.00 *U1, R3*	$91.50 *U1, R3, W8*	$107.00 *U1, R3, W8*	5.90 *U1*	5.00 *U1, W8* 5.00 *P13*	7.35 *U1, Y1* 6.00 *W8*	5.00 *U1*	4.675 *N4* 4.675 *A1*	6.95 *A1, T8* 6.95 *M8*			7.75 *W8, S9*	14.55 *A1, S9, T8*
	Cleveland, Ohio									6.85 *A5, J3*			7.75 *J3*	
	Detroit, Mich.			$107.00 *R5*					4.775 *G3, M2*	6.95 *M2, G3, D2, P11*	7.05 *G3*	10.10 *G3, D2*	7.75 *G3*	
	Anderson, Ind.									6.85 *G4*		10.10 *G4*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$74.00 *U1*	$91.50 *U1*	$107.00 *U1, Y1*	5.90 *I3*	5.00 *U1*	7.35 *U1, I3*	5.25 *I3*	4.675 *U1, I3, Y1*	6.85 *Y1*	6.95 *U1, I3, Y1*	10.20 *Y1*	7.75 *U1, Y1*	
	Sterling, Ill.	$74.00 *N4*				5.00 *N4*			4.775 *N4*					
	Indianapolis, Ind.									7.00 *C5*				
	Newport, Ky.												7.75 *A9*	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		$91.50 *S1, C10*	$107.00 *S1, C10*					4.675 *S1, R3*	6.85 *T4*	6.95 *S1, R3*	10.00 *S1, R3*	7.75 *S1*	14.55 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$74.00 *U1*	$91.50 *U1, C11*	$107.00 *U1, C11*	5.90 *U1*	5.00 *U1, J3*	7.35 *U1, J3*	5.00 *U1*	4.675 *P6*	5.750 *P6* 6.85 *J3, B4, S7*			7.75 *S9*	14.55 *S9*
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.					5.00 *W3*			4.675 *W3*	6.85 *W3, F3*	6.95 *W3*	9.65 *W3*		
	Youngstown, Ohio	$74.00 *R3*	$91.50 *Y1, C10*	$107.00 *Y1*			7.35 *Y1*			6.85 *Y1, C5*	6.95 *U1, Y1*	10.20 *Y1*	7.75 *U1, Y1*	
F. WEST	Fontana, Cal.	$83.50 *K1*	$101.00 *K1*	$128.00 *K1*		5.75 *K1*	8.10 *K1*	5.90 *K1*	5.525 *K1*	8.70 *K1*				
	Geneva, Utah		$91.50 *C7*			5.00 *C7*	7.35 *C7*							
	Kansas City, Mo.					5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			
	Los Angeles, Torrance, Cal.		$101.00 *B2*	$127.00 *B2*		5.70 *C7, B2*	8.05 *B2*		5.425 *B2, C7*	8.90 *C1*			8.95 *B2*	
	Minnequa, Colo.					5.30 *C6*			5.775 *C6*					
	Portland, Ore.					5.75 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$101.00 *B2*			5.65 *B2*	8.00 *B2*		5.425 *C7, B2*					
	Seattle, Wash.		$105.00 *B2*			5.75 *B2*	8.10 *B2*		5.675 *B2*					
SOUTH	Atlanta, Ga.								4.875 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$74.00 *T2*	$91.50 *T2*			5.00 *T2, R3* 5.00 *C16*	7.35 *T2*		4.675 *T2, R3* 4.975 *C10* 4.675 *C16*		6.95 *T2*			
	Houston, Lone Star, Texas	$80.00 *L3*	$96.50 *S2*	$112.00 *S2*		5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			

STEEL PRICES

(Effective April 23, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot rolled *18* ga. & hvyr.	Cold rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Cokes* *1.25*-lb. base box	Electro* *0.25* lb. base box	Holloware Enameling *29* ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.675 *B3*	5.75 *B3*				6.90 *B3*	8.525 *B3*			5.80 *W6*			
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.725 *A2*	5.80 *A2*				6.95 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.80 *B3*			
	Fairless, Pa.	4.725 *U1*	5.80 *U1*				6.95 *U1*	8.575 *U1*				$9.80 *U1*	$8.50 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.675 *B3*	5.75 *B3*	6.30 *B3*			6.90 *B3*	8.575 *B3*	9.275 *B3*		5.90 *B3*	$9.80 *B3*	$8.50 *B3*	
	Worcester, Mass.										6.10 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										6.00 *L1*			
	Ashland, Ky.	4.675 *A7*		6.30 *A7*	6.325 *A7*									
	Canton-Massillon, Dover, Ohio			6.30 *R3,R1*										
	Chicago, Joliet, Ill.	4.675 *W8, A1*					6.90 *U1*			5.80 *K2*	5.80 *A5,R3, N4,W8, K2*			
	Sterling, Ill.										5.90 *N4, K2*			
	Cleveland, Ohio	4.675 *J3, R3*	5.75 *J3, R3*		6.325 *R3*		6.90 *R3*	8.525 *R3, J3*			5.80 *A5*			
	Detroit, Mich.	4.775 *G3, M2*	5.85 *G3* 5.75 *M2*				7.00 *G2*	8.625 *G3*						
	Newport, Ky.	4.675 *A9*	5.75 *A9*											
	Gary, Ind. Harbor, Indiana	4.675 *U1, I3,Y1*	5.75 *U1, I3,Y1*	6.30 *U1, I3*	6.325 *U1, I3,Y1*	6.70 *U1*	6.90 *U1, Y1,I3*	8.525 *U1, Y1*			5.80 *Y1*	$9.70 *U1, Y1*	$8.40 *I3, U1,Y1*	7.15 *U1, Y1*
	Granite City, Ill.	4.875 *G2*	5.95 *G2*	6.50 *G2*	6.525 *G2*								$8.50 *G2*	7.25 *G2*
	Kokomo, Ind.			6.40 *C9*							5.90 *C9*			
	Mansfield, Ohio		5.75 *E2*			6.70 *E2*								
	Middletown, Ohio		5.75 *A7*	6.30 *A7*	6.325 *A7*	6.70 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.675 *S1, R3,N3*	5.75 *R3*	6.30 *R3*	6.325 *N3*	6.70 *N3*	6.90 *S1, R3*	8.525 *S1, R3*					$8.40 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.675 *U1, J3,P6*	5.75 *U1, J3,P6*	6.30 *U1, J3*	6.325 *U1*		6.90 *U1, J3,R3*	8.525 *U1, J3*	9.275 *U1*		5.80 *A5, P6,J3*	$9.70 *J3, U1*	$8.40 *U1, J3*	7.15 *U1, J3*
	Portsmouth, Ohio	4.675 *P7*	5.75 *P7*								5.80 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.675 *W3, W5*	5.75 *W3, W5,F3*	6.30 *W3, W5*		6.70 *W3, W5*	6.90 *W3*	8.525 *W3*				$9.70 *W5, W3*	$8.40 *W5, W3*	7.15 *W5* 7.40 *W3*
	Youngstown, Ohio	4.675 *U1, Y1*	5.75 *Y1*		6.325 *Y1*		6.90 *Y1*	8.525 *Y1*			5.80 *Y1*			
WEST	Fontana, Cal.	5.525 *K1*	7.00 *K1*				7.75 *K1*	9.775 *K1*				$10.45 *K1*	$9.15 *K1*	
	Geneva, Utah	4.775 *C7*												
	Kansas City, Mo.										6.05 *S2*			
	Los Angeles, Torrance, Cal.										6.60 *B2*			
	Minnequa, Colo.										6.05 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.375 *C7*	6.70 *C7*	7.05 *C7*							6.60 *C7*	$10.45 *C7*	$9.15 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.675 *T2, R3*	.575 *T2*	6.30 *T2, R3*							5.80 *T2,R3*	$9.80 *T2*	$8.50 *T2*	
	Houston, Tex.										6.05 *S2*			

† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box.

* COKES: 1.50-lb. add 25¢.

ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.

IRON AGE

STEEL PRICES

(Effective April 28, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.125 *B3*	8.325 *B3*	7.40 *B3*					
	Buffalo, N. Y.	5.075 *B3,R3*	5.075 *B3,R3*	6.90 *B5*	6.125 *B3,R3*	8.325 *B5,B3*	7.40 *B3*	4.85 *B3*				7.20 *W6*
	Claymont, Del.							5.70 *C4*		6.85 *C4*	7.55 *C4*	
	Coatesville, Pa.							5.25 *L4*		6.85 *L4*	7.55 *L4*	
	Conshohocken, Pa.							4.95 *A2*	5.925 *A2*	6.85 *A2*	7.25 *A2*	
	Harrisburg, Pa.							5.80 *P2*	6.275 *P2*			
	Hartford, Conn.			7.35 *R3*		8.625 *R3*	7.40 *B3*					
	Johnstown, Pa.	5.075 *B3*	5.075 *B3*		6.125 *B3*			4.85 *B3*		6.85 *B3*	7.25 *B3*	7.20 *B3*
	Fairless, Pa.	5.225 *U1*	5.225 *U1*		6.275 *U1*							
	Newark, N. J.			7.30 *W10*		8.50 *W10*						
	Camden, N. J.			7.30 *P10*		8.50 *P10*						
	Bridgeport, Conn. Putnam, Conn.	5.30 *N8*	5.30 *N8*	7.20 *N8* 7.40 *W10*	6.20 *N8*	8.475 *N8*	7.56 *N8*					
	Sparrows Pt., Md.		5.075 *B3*					4.85 *B3*		6.85 *B3*	6.85 *B3*	7.30 *B3*
	Palmer, Worcester, Readville, Mass. Milton, Mass.	5.225 *M7*	5.225 *M7*	7.40 *B5,C14*		8.625 *A5* 8.625 *B5*						7.50 *A5,W6* 9.025 *T8*
	Spring City, Pa.			7.30 *K4*		8.50 *K4*						
MIDDLE WEST	Alton, Ill.	5.275 *L1*										7.40 *L1*
	Ashland,Newport,Ky.							4.85 *A7,A9*		6.85 *A9*		
	Canton, Massillon, Ohio			6.85 *R3,R2*	6.125 *R3,T5*	8.325 *R3,R2, T5*						
	Chicago, Joliet, Ill.	5.075 *U1,R3, W8,N4* 5.075 *P13*	5.075 *U1,R3, N4* 5.075 *P13*	6.85 *A5,B5, W10,L2 W8,N9*	6.125 *U1,R3, W8*	8.325 *A5,B5, W8,L2,N9, W10*	5.875 *W8* 7.425 *U1*	4.85 *U1,I3, W8,A1*	5.925 *U1*	6.85 *U1,W8*	7.25 *U1*	7.20 *A5, K2 R3,N4,W7*
	Cleveland, Ohio	5.075 *R3*	5.075 *R3*	6.85 *A5,C13*		8.325 *A5,C13*	7.425 *R3*	4.95 *J3,R3*	5.925 *J3*		7.25 *J3,R3*	7.20 *A5, C13*
	Detroit, Mich.	5.175 *G3*	5.425 *G3*	7.05 *B5,P8* 7.10 *P3* 6.85 *R5*	6.225 *G3* 6.125 *R5*	8.525 *B5,P3, P8* 8.325 *R5*	7.525 *G3*	4.95 *G3*		6.90 *G3*		
	Duluth Minn.											7.20 *A5*
	Gary, Ind. Harbor, Crawfordsville	5.075 *U1,I3, Y1*	5.075 *U1,I3, Y1*	6.85 *R3,M5*	6.125 *U1,I3, Y1*	8.325 *R3,M4*	7.425 *U1,I3, Y1*	4.85 *U1,I3, Y1*	5.925 *I3*	6.85 *U1,Y1*	7.25 *U1,Y1*	7.30 *M4*
	Granite City, Ill.							5.05 *G2*				
	Kokomo, Ind.											7.30 *C9*
	Sterling, Ill.	5.175 *N4*	5.175 *N4*					4.85 *N4*				7.30 *K2*
	Niles, Warren, Ohio Sharon, Pa.			6.85 *C10*	6.125 *C10,S1*	8.325 *C10*	7.425 *S1*	4.85 *S1,R3*		6.85 *S1*	7.25 *S1,R3*	
	Pittsburgh, Pa. Midland, Pa.	5.075 *U1, C11,J3*	5.075 *U1,J3*	6.85 *A5,C8, J3,R3,S9, B4,W10,C11*	6.125 *U1, C11,J3*	8.325 *A5,R3, S9,C8,W10, C11*	7.425 *U1,J3*	4.85 *U1,J3*	5.925 *U1*	6.85 *U1,J3*	7.25 *U1,J3*	7.20 *A5,J3, P6*
	Portsmouth, Ohio											7.20 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							4.85 *W5*				
	Youngstown, Ohio	5.075 *U1, Y1,R3*	5.075 *U1, Y1,R3*	6.85 *U1,Y1, F2*	6.125 *U1,Y1*	8.325 *Y1,F2*	7.425 *U1,Y1*	4.85 *U1,Y1, R3*		6.85 *Y1*	7.25 *Y1* 7.25 *U1*	7.20 *Y1*
WEST	Emeryville, Cal.	5.825 *J5*	5.825 *J5*									
	Fontana, Cal.	5.775 *K1*	5.775 *K1*		7.175 *K1*		8.125 *K1*	5.60 *K1*		7.60 *K1*	8.00 *K1*	
	Geneva, Utah							4.85 *C7*			7.25 *C7*	
	Kansas City, Mo.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*					7.45 *S2*
	Los Angeles, Torrance, Cal.	5.775 *C7,B2*	5.775 *C7,B2*	8.30 *R3,P14*	7.175 *B2*	10.20 *P14*	8.125 *B2*					8.15 *B2*
	Minnequa, Colo.	5.525 *C6*	5.525 *C6*					5.70 *C6*				7.45 *C6*
	Portland, Ore.	5.825 *O2*	5.825 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.775 *C7* 5.825 *B2* 6.025 *P9*	5.775 *C7* 5.825 *B2* 6.025 *P9*				8.175 *B2*					8.15 *C7,C6*
	Seattle, Wash.	5.825 *B2, N6*	5.825 *B2*				8.175 *B2*	5.75 *B2*		7.75 *B2*	8.15 *B2*	
SOUTH	Atlanta, Ga.	5.275 *A8*										7.40 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.075 *T2,R3* 5.075 *C16*	5.075 *T2,R3* 5.075 *C16*	7.45 *C16*			7.425 *T2*	4.85 *T2,R3*			7.25 *T2*	7.20 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*	4.95 *S2* 5.20 *L3*		6.95 *S2*	7.35 *S2*	7.45 *S2*

† Merchant Quality—Specialty Quality .35¢ higher.

STEEL PRICES *(Effective April 23, 1957)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland.
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metals Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Dearborn Div., Sharon Steel Corp.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
H1 Hanna Furnace Corp., Detroit
I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.
Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In		2½ 3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Youngstown *R3*	9.25	+10.00	12.25	+6.00	15.75	+1.50	18.25	0.25	18.75	1.25	19.25	1.75	20.75	2.50								
Fontana *K1*	+3.75	+19.00	+0.75	+15.00	2.75	+10.50	5.25	+9.75	5.75	+8.75	6.25	+8.25	7.75	+8.50								
Pittsburgh *J3*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
Alton, Ill. *L1*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Sharon *M5*	9.25	+10.00	12.25	+2.00	15.75	+1.50	18.25	0.25	18.75	1.25	19.25	1.75	20.75	2.50								
Fairless *N2*	7.25	+8.00	10.25	+4.50	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Pittsburgh *N1*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
Wheeling *W5*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25								
Wheatland *W4*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25								
Youngstown *Y1*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
Indiana Harbor *Y1*	8.25	+9.00	13.25	+2.00	14.75	1.50	17.25	2.25	17.75	3.25	18.25	3.75	19.75	4.25								
Lorain *N2*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Youngstown *R3*	13.75	+4.00	17.75	list	20.75	4.50	21.25	4.25	21.75	5.25	22.25	5.75	22.75	5.50								
Fairless *N2*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Fontana *K1*	0.75		4.75		7.75		8.25		8.75		9.25		9.75									
Pittsburgh *J3*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50
Alton, Ill. *L1*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Sharon *M5*	13.75	+4.00	17.75	list	20.75	4.50	21.25	4.25	21.75	5.25	22.25	5.75	22.75	5.50								
Pittsburgh *N1*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50
Wheeling *W5*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50								
Wheatland *W4*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50								
Youngstown *Y1*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50
Indiana Harbor *Y1*	12.75	+1.00	16.75	3.00	19.75	7.50	20.25	6.25	20.75	7.25	21.25	7.75	21.75	6.50								
Lorain *N2*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in. 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.68	T-1
18	4	1	—	5	2.385	T-4
18	4	2	—	—	1.185	T-2
1.5	4	1.5	8	—	1.04	M-1
6	4	3	6	—	1.43	M-3
6	4	2	5	—	1.185	M-2

High-carbon chromium.. .83 D-3, D-5
Oil hardened manganese .45 O-2
Special carbon ..... .41 W-1
Extra carbon ..... .345 W-1
Regular carbon ..... .29 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*A3, J2, L4*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	35.50
	304	34.60	38.00	41.50	37.75
	316	39.70	43.20	46.65	55.50
	321	36.35	39.80	43.50	44.75
	347	39.50	43.95	48.45	54.25
	405	29.20	33.15	37.05	.....
	410, 430	28.70	32.65	36.55	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 39.85; 1 side, 33.00.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	9.00	9.20	.....
Armature	10.35	10.35	10.85
Elect.	11.00	11.025	11.525
Motor	12.05	12.075	12.575
Dynamo	13.05	13.05	13.55
Trans. 72	14.05	14.05	14.55
Trans. 65	14.60	Grain Oriented	
Trans. 58	15.10	Trans. 80	18.50
Trans. 52	16.15	Trans. 73	19.00

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*) (20¢ higher, HR); Zanesville, Butler (*A7*).

LAKE SUPERIOR ORES

51.50% *Fe natural content, delivered lower Lake ports. Prices for 1957 season. Freight changes for seller's account.*

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	167	181	...	195	187	8.10	8.50
Aliquippa, Pa. *J3****	164	179	...	...	181	8.20	8.875
Atlanta *A8***	166	182	...	192	190	8.05	8.65
Bartonville *K2***	166	182	...	198	190	8.30	9.06
Buffalo *W6*	...	...	...	...	...	8.20	8.75
Chicago, Ill. *N4***	164	180	167	196	188	8.35	9.10
Cleveland *A6*	173	...	...	...	...	8.20	8.75
Cleveland *A5*	...	...	...	...	...	8.20	...
Crawfordsville *M4***	166	182	...	198	190	8.30	9.05
Donora, Pa. *A5*	164	176	...	196	184	8.20	8.75
Duluth *A5*	164	176	167	196	184	8.20	8.75
Fairfield, Ala. *T2*	164	176	...	196	184	8.20	8.75
Galveston *D4*	180‡	...	...	...	...	...	...
Houston *S2*	169	181	...	195	189	8.45	9.00
Johnstown, Pa. *B3***	164	180	167	...	188	8.20	8.95
Joliet, Ill. *A5*	164	176	...	196	184	8.20	8.75
Kokomo, Ind. *C9**	166	178	...	198	186	8.30	8.85
Los Angeles *B2****	...	...	...	...	...	9.15	9.90
Kansas City *S2**	169	181	...	195	189	8.45	9.00
Minnequa *C6*†*	169	181	172	195	189	8.45	9.00
Monessen *P6*	167	185	...	...	191	8.10	8.10
Palmer, Mass. *W6*	...	...	...	...	...	8.50	9.05
Pittsburg, Cal. *C7*	183	199	...	220	204	9.15	9.70
Rankin, Pa. *A5*	164	176	...	...	184	8.20	8.75
So. Chicago *R3*	167	181	...	195	187	8.10	8.50
S. San Francisco *C6*†	...	...	...	214	...	9.15	9.70
Sparrows Pt. *B3*****	166	...	...	198	190	8.30	9.05
Struthers, O. *Y1**	...	...	...	...	...	8.20	8.85
Worcester *A5*	170	...	...	...	...	8.50	9.05
Williamsport, Pa. *S5*	...	...	175	...	...	...	...

* Zinc less than .10¢. † Plus zinc extras.
** 13.5 zinc. ‡ Wholesalers only.
*** .10¢ zinc.

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Hot-Rolled (special quality)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.17	9.37	9.83	8.21	8.55	8.59	8.45	.....	10.23	.....	.....	.....	.....
Baltimore	$.10	7.98	9.08	9.12	8.46	8.36	8.57-8.85	8.53	.....	9.23	14.99	14.44	18.39	18.09
Birmingham	.15	7.68-7.80	8.88-9.00	9.52	7.78-7.82	8.01-8.16	8.05-8.20	8.07	8.44	10.04-10.12	.....	.....	.....	.....
Boston	.10	8.94	9.98	11.16	8.99	9.28	9.20	9.17	9.57	.....	15.79	14.79	19.14	18.39
Buffalo	.15	8.00	9.15	10.90	8.20	8.65	8.65	8.40	8.85	8.85	15.65	14.65	19.01	18.25
Chicago	.15	7.95	9.15	9.85	7.97	8.31	8.35	8.22	8.50	8.50	15.30	14.30	18.65	17.90
Cincinnati	.15	8.09	9.20	9.90	8.29	8.67	8.89	8.53	8.87	8.99	15.61	14.61	18.96	18.21
Cleveland	.15	7.93	9.13	9.75	8.07	8.54	8.72	8.31	8.67	8.75	15.39	14.39	18.74	17.99
Denver		9.70	11.30	12.49	9.80	9.70	9.80	9.95	.....	10.65	.....	.....	.....	17.60
Detroit	.15	8.18	9.40	10.20	8.32	8.66	8.89	8.52	8.86	8.85	15.46	14.56	18.81	18.16
Houston		8.80	9.75	.....	8.85	8.80	9.10	9.15	.....	10.65	15.50	.....	19.30	19.05
Kansas City	.20	8.52	9.72	10.07	8.60	8.83	8.87	8.73	.....	9.42	15.32	14.77	18.72	18.42
Los Angeles	.10	9.20	10.90	11.35	9.25	9.75	9.25	9.10	9.30	12.20	16.45	15.60	20.30	19.70
Memphis	.15	8.02	9.22	.....	8.12	8.35	8.39	8.25	.....	9.85	.....	.....	.....	.....
Milwaukee	.15	8.08	9.28	9.98	8.10	8.44	8.56	8.35	8.71	8.72	15.43	14.43	18.78	18.03
New York	.10	8.55	9.76	10.33	9.00	9.11	9.01	9.11	9.48	.....	15.02	14.69	18.42	18.29
Norfolk	.20	8.00	.....	.....	8.40	8.35	8.70	8.45	.....	10.70	.....	.....	.....	.....
Philadelphia	.10	8.25	9.17	10.39	8.92	8.78	8.80	8.81	9.18	9.41	15.61	14.61	18.96	18.21
Pittsburgh	.15	7.93	9.14	10.20	8.07	8.31	8.35	8.22	8.59	8.75	15.30	14.30	18.65	17.90
Portland		9.20	9.65	11.60	10.25-11.05	9.00	9.35	9.45	.....	13.80	16.70	16.10	20.40	20.25
San Francisco	.10	9.05	10.40	10.90	9.05	9.30	9.15	9.15	9.90	12.40	16.45	15.60	20.30	19.70
Seattle		9.55	10.70	11.65	9.55	9.30	9.35	9.50	9.85	13.40	16.55	15.85	19.50	19.45
Spokane	.15	9.70	10.85	11.80	9.70	9.45	9.50	9.65	10.00	13.55	.....	16.75	.....	20.35
St. Louis	.15	8.29	9.49	10.21	8.34	8.67	8.82	8.58	8.96	9.11	15.66	14.66	19.01	18.26
St. Paul	.15	8.39	9.59	10.31	8.43	8.90	8.94-9.09	8.53	.....	9.21	.....	14.62	.....	18.27

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.
† 16 gage. †† 13½¢ zinc. ‡ Deduct for country delivery.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Baltimore, Md. *T8*	9.20	10.40	12.60	15.60	18.55
Bristol, Conn. *W12*	...	10.40	12.60	15.60	18.55
Boston *T8*	9.20	10.40	12.60	15.60	18.55
Buffalo, N. Y. *R7*	8.65	10.10	12.30	15.30	18.25
Carnegie, Pa. *S9*	8.65	10.10	12.30	15.30	.....
Cleveland *A5*	8.65	10.10	12.30	15.30	18.25
Detroit *D1*	8.75	10.20	12.40	15.40	.....
Detroit *D2*	8.75	10.20	12.40	...	.....
Dover, O. *G4*	8.65	10.10	12.30	15.30	18.25
Evanston, Ill. *M8*	8.65	10.10	12.30	...	.....
Franklin Park, Ill. *T8*	8.75	10.10	12.30	15.30	18.25
Harrison, N. J. *C11*	...	...	12.60	15.60	18.55
Indianapolis *C5*	8.80	10.25	12.30	15.30	18.25
Los Angeles	10.85	12.30	14.50	...	.....
New Castle, Pa. *B4*	8.65	10.10	12.30	15.30	.....
New Haven, Conn. *D1*	9.10	10.40	12.60	15.60	.....
Pawtucket, R. I. *N7*	9.20	10.40	12.60	15.60	18.55
Pittsburgh *S7*	8.65	10.10	12.30	15.30	18.25
Riverdale, Ill. *A1*	8.75	10.10	12.30	15.30	18.25
Sharon, Pa. *S1*	8.65	10.10	12.30	15.30	18.25
Trenton *R4*	11.05	10.40	12.60	15.60	18.55
Wallingford *W1*	9.10	10.40	12.60	15.60	18.45
Warren, Ohio *T4*	8.65	10.10	12.30	15.30	18.25
Worcester, Mass. *A5*	9.20	10.40	12.60	15.60	18.55
Youngstown *C5*	8.65	10.10	12.30	15.30	18.25

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	36.34	42.56	33.21	.....
	2½	12	48.94	57.31	44.73	.....
	3	12	56.51	66.18	51.66	.....
	3½	11	65.97	77.25	60.30	.....
	4	10	87.61	102.59	80.07	.....
National Tube	2	13	36.34	42.56	33.21	.....
	2½	12	48.94	57.31	44.73	.....
	3	12	56.51	66.18	51.66	.....
	3½	11	65.97	77.25	60.30	.....
	4	10	87.61	102.59	80.07	.....
Pittsburgh Steel	2	13	36.34	42.56	.....	.....
	2½	12	48.94	57.31	.....	.....
	3	12	56.51	66.18	.....	.....
	3½	11	65.97	77.25	.....	.....
	4	10	87.61	102.59	.....	.....

(Effective April 23, 1957)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.275	6.25	6.60				
Cleveland							13.85
So. Chicago *R3*				9.225			
Ensley *T2*	5.275	6.25					
Fairfield *T2*		6.25		9.225		6.275	
Gary *U1*	5.275					6.275	
Huntington *C16*		6.25					
Ind. Harbor *I3*	5.275		6.60	9.225		6.275	
Ind. Harbor *Y1*				9.225			
Johnstown *B3*		6.25					
Joliet *U1*			6.60				
Kansas City *S2*				9.225			13.85
Lackawanna *B3*	5.275	6.25	6.60			6.275	
Lebanon *B3*							13.85
Minnequa *C6*	5.275	6.75	6.60	9.225		6.275	13.85
Pittsburgh *P5*							13.85
Pittsburgh *J3*				9.225			
Seattle *B2*				9.725		6.425	13.85
Steelton *B3*	5.275		6.60			6.275	13.85
Struthers *Y1*				9.225			
Torrance *C7*						6.425	
Williamsport *S8*		6.15					
Youngstown *R3*				9.225			

COKE

Furnace, beehive (f.o.b. oven) Connellsville, Pa.	Net-Ton $15.00 to $15.75
Foundry, beehive (f.o.b. oven)	$17.50 to $19.00
Foundry oven coke	
Buffalo, del'd	$31.75
Detroit, f.o.b.	30.50
New England, del'd	31.55
Kearney, N. J., f.o.b.	29.75
Philadelphia, f.o.b.	29.50
Swedeland, Pa., f.o.b.	29.50
Painesville, Ohio, f.o.b.	30.50
Erie, Pa., f.o.b.	30.50
Cleveland, del'd	32.65
Cincinnati, del'd	31.84
St. Paul, f.o.b.	29.75
St. Louis, f.o.b.	31.50
Birmingham, f.o.b.	28.85
Milwaukee, f.o.b.	30.50
Neville Is., Pa.	29.25

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	24.75	40	100,110	10.70
20	72	24.00	35	110	10.70
16 to 18	72	24.50	30	110	10.85
14	72	25.00	24	72 to 84	11.25
12	72	25.50	20	90	11.00
10	60	26.50	17	72	11.40
10	48	27.00	14	72	11.85
7	60	26.75	12	60	12.95
6	60	30.00	10	60	13.00
4	40	33.25	8	60	13.30
3	40	35.25			
2½	30	37.25			
2	24	57.75			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Cast elliptical, 18 in. or longer, 5000 lb lots	49.42
Electrodeposited	39.25
Brass, 80-20, ball anodes, 2000 lb or more	50.00
Zinc, ball anodes, 2000 lb lots (for elliptical add 2¢ per lb)	21.25
Nickel, 99 pct plus, rolled carbon, 5000 lb	$1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium	$1.70
Tin, ball anodes and elliptical	$1.07 per in.

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	76.00
Copper sulphate, 100 lb bags, per cwt.	24.35
Nickel salts, single, 100 lb bags	40.50
Nickel chloride, freight allowed, 300 lb	45.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.05
(Philadelphia price 23.30)	
Zinc cyanide, 100 to 900 lb	55.55
Potassium cyanide, 100 lb drum N. Y.	48.00
Chromic acid, flake type, 1 to 20 100-499 lb drums	31.75

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
	Pct Discounts			
½" and smaller x 6" and shorter	52½	56½	58½	59½
⅞" thru 1" x longer than 6"	43½	47½	50	51½
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	52½	56½	58½	59½
Lag, all diam. x 6" & shorter	52½	56	58	59
Lag, all diam. longer than 6 in.	44½	48	50	51
Plow bolts, ½" and smaller x 6" and shorter	52	55½	57	58

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.

	Full Case or Keg Price
¾ in. or smaller	61½
⅞ in. to 1 in. inclusive	57½
1⅛ in. to 1½ in. inclusive	62½
1⅝ in. and larger	56

C. P. Hex reg. & hvy.

¾ in. and smaller	61½
⅞ in. to 1½ in. inclusive	57½
1⅝ in. and larger	56

Hot Galv. Nuts (All Types)

¾ in. and smaller	48

Semi-finished Hex Nuts

¾ in. or smaller	61½
⅞ in. to 1½ in. inclusive	57½
1⅝ in. and larger	56

(Add 25 pct for broken case or keg quantities)

Finished

1 in. and smaller	64

Rivets

	Base per 100 lb
½ in. and larger	$11.50
	Pct Off List
7/16 in. and smaller	23

Cap Screws

	Discount (Packages) Bright	Treated H. C. Heat
New std. hex head, packaged		
⅝" diam. and smaller x 6" and shorter	44	31
¾", ⅞" and 1" diam. x 6" and shorter	27	9
⅝" diam. and smaller x longer than 6"	14	+ 6
¾", ⅞" and 1" diam. & longer than 6"	½	+24

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	44	61
¾" through 1" dia. x 6" and shorter	27	49

Minimum quantity—¼" through ⅝" diam., 15,000 pieces; 1/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

	Quantity	Discount Mach. Screws	Stove Bolts
Plain Finish Cartons		19	32
Bulk			
To ¼" diam. incl.	25,000-200,000	9	54
5/16 to ½" diam. incl.	15,000-100,000	9	54
All diam. over 3" long	5,000-100,000	—	54

Machine Screw & Stove Bolt Nuts

	Quantity	Discount Hex	Square
In cartons		16	19
In Bulk			
⅜" diam. & smaller	15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham	119.0
New York	131.7
Chicago	134.1
San Francisco-L. A.	141.8

Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick

	Carloads per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$135.00
No. 1 Ohio	120.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	120.00
No. 2 Ohio	103.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00)	21.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$150.00
Childs, Hays, Pa.	155.00
Chicago District	160.00
Western Utah	175.00
California	180.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	157.00-160.00
Silica cement, net ton, bulk, Latrobe	28.50
Silica cement, net ton, bulk, Chicago	25.50
Silica cement, net ton, bulk, Ensley, Ala.	26.50
Silica cement, net ton, bulk, Mt. Union	24.50
Silica cement, net ton, bulk, Utah and Calif.	37.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$105.00
Standards chemically bonded, Curtiner, Calif.	115.00
Burned, Balt.	99.00

Magnesite Brick

Standard, Baltimore	$131.00
Chemically bonded, Baltimore	116.00

Grain Magnesite

St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.00
Midwest	16.35
Missouri Valley	15.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh

Swedish sponge iron f.o.b. Riverton, N. J., ocean bags	8.50¢
Canadian sponge iron, Del'd in East, carloads	9.5¢
Domestic sponge iron, 98+% Fe, carload lots	8.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 5 to 10 micron, 98%, 99.8+% Fe	86.0¢ to $1.55
Aluminum, freight allowed	38.00¢
Brass, 10 ton lots	37.50¢ to 50.00¢
Copper, electrolytic	49.75¢
Copper, reduced	49.75¢
Cadmium, 100-199 lb, 95¢ plus metal value	
Chromium, electrolytic, 99.85% min. Fe .03 max. Del'd	$5.00
Lead	8.90¢ plus metal value
Manganese f.o.b. Exton, Pa.	46.0¢
Molybdenum, 99%	$3.60 to $3.95
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed 280	$1.13
Silicon	43.50¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	99.0¢
Stainless steel, 316	$1.32
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$4.00 (nominal)
Zinc, 10 ton lots	18.75¢ to 32.50¢

WILLIAMS-WHITE Hydraulic Gap Frame Presses

With Adjustable Pressure and Stroke

- Capacity ..... 100 Tons
- Table, R-L, F-B 96"x54"
- Daylight ..... 30"
- Stroke ..... 18"

This WILLIAMS-WHITE Hydraulic Gap Frame Press is of steel plate, welded construction with integral table. It is equipped with sensitive hand lever control with latch for holding pressure. Press has two double acting kicker pistons for rapid approach and return speeds. Gap Frame Presses can be built in capacities from 15 tons.

For details, write your nearest WILLIAMS-WHITE representative or direct to us.

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CHARLES MUNDT & SONS
50 FAIRMOUNT AVE. **JERSEY CITY, N. J.**

FERROALLOY PRICES

(Effective April 23, 1957)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr. .30-1.00% max. Si.

0.02% C	41.50	0.20% C	38.50
0.03% C	41.00	0.50% C	38.25
0.06% C	39.50	1.00% C	37.50
0.10% C	39.00	1.50% C	37.35
0.15% C	38.75	2.00% C	37.25

4.00-4.50% C, 67.70% Cr, 1-2% Si.. 27.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 27.75
0.025% C (Simplex) 34.75
0.10% C, 50-52% Cr, 2% max Si .. 35.50
8.50% max. C, 50-55% Cr, 3-6% Si .. 24.00
8.50% C, 50-55% Cr, 3% max. Si... 24.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.31
0.50% max. C	1.31
9 to 11% C, 88-91% Cr, 0.75% Fe ..	1.40

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (¾" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.29
Ton lots	1.31
Less ton lots	1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads	44.65
Ton lots	48.95
Less ton lots	51.45

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Maganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	24.25
Ton lots	26.15
Less ton lots	27.15

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ¼ in. x 12 mesh.

Ton lots	20.15
Less ton lots	21.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	17.10
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

	Cents per-lb
Producing Point	
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.75
Johnstown, Pa.	12.75
Sheridan, Pa.	12.75
Philo, Ohio	12.75
S. Duquesne	12.75

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	14.80
Ton lots packed	17.20

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	34.00
Ton lots	36.00
250 to 1999 lb	38.00
Premium for Hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn... 25.50

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.40
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si....	28.60	31.40	32.60

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	12.80
Ton lots	14.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet	14.10
Ton lots, packed	16.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots, packed	Carloads, packed
96.75% Si, 1.25% Fe ..	23.70	22.40
98% Si, 0.75% Fe	24.45	23.15

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	7.70
Ton lots, packed	10.50

Electric Ferrosilicon

Contract prices, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si	13.00	75% Si	16.80
65% Si	15.65	85% Si	18.50
		90% Si	19.90

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openh-earth	3.20
Crucible	3.30
High speed steel (Primos)	3.40

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots..	2.40	3.30	4.55

Alsifer, 20% Al, 40% Si, 40% Fe. Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound Contained Mo $1.28

Ferrocolumbium, 50-50%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$5.10
Less ton lots	5.15

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd ton lots, 2-in. x D per lb con't Sb plus Ta..... $4.25

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth Pa., per pound contained Mo.. $1.68

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton..... $90.00
10 tons to less carload..... $110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb. contained Ti..... $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $240.00

Ferrotungsten, ¼ x down, packed, per pounds contained W, ton lots delivered..... $2.95 (nominal)

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.41
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.33

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 contract, basis, per pound contained V_2O_5 ..... $1.38

Zirconium contract basis, per lb of alloy
35-40% f.o.b. freight allowed, carloads, packed ..... 27.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload..... $5.50

Bortam, f.o.b. Niagara Falls,

Ton lots per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots.... 1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

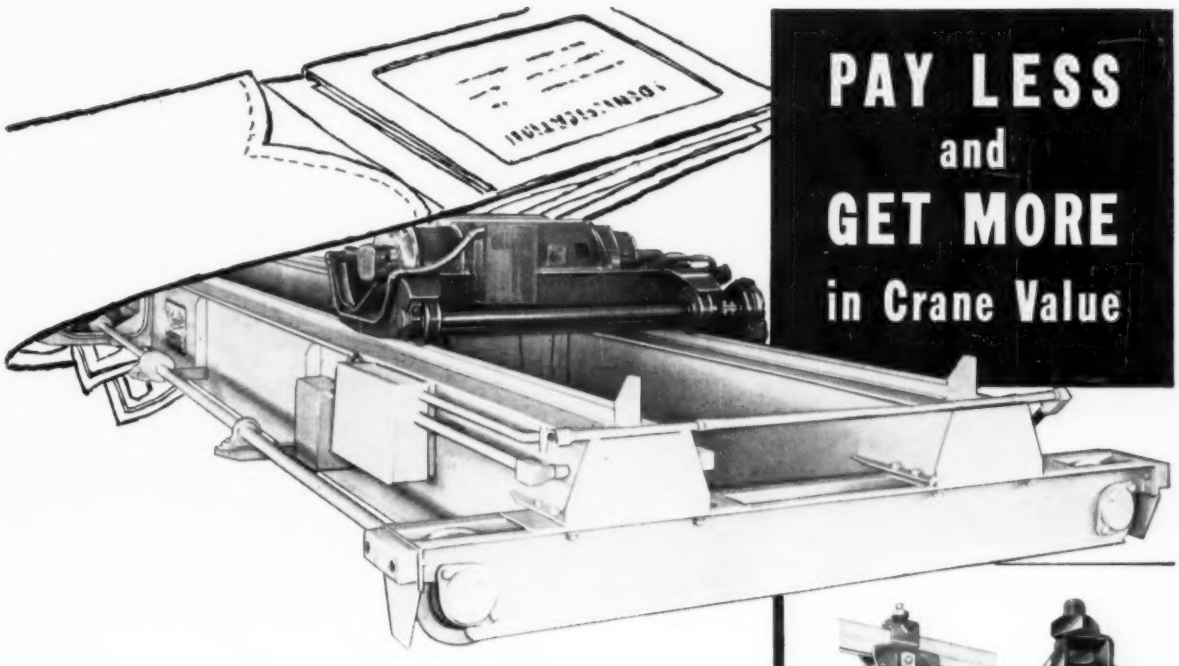
Grainal, f.o.b. Bridgeville, Pa., freight, allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese - Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots..... $2.15

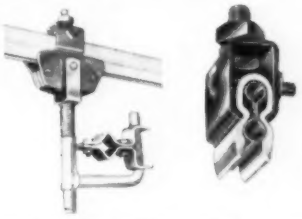


PAY LESS and GET MORE in Crane Value

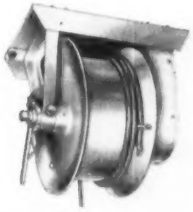
Series "D" 'Load Lifter' Cranes cost less than other brands available for average industrial service. They can be priced substantially lower for two reasons: 1) the use of highly standardized components and 2) mass production methods. More value is built in: they have a combination of design and construction features you would expect only in the most expensive cranes. These features assure completely dependable crane service plus low power consumption and economical maintenance.

Series "D" Cranes operate smoothly. Needless dead weight is engineered out and anti-friction bearings are engineered in wherever practicable to eliminate drag and retard wear. All gearing operates in oil. Comparatively low headroom is combined with high hook lift. The double braking system makes load control accurate and easy. Positive magnetic control is provided for floor and cage controlled types. A three-girder bridge is standard for spans under 40 feet; box-section welded girders for spans up to 80 feet. No whipping or skewing.

Series "D" Cranes fit the job — and your pocketbook. Capacities range from 1 to 20 tons. Selection is easy. No complex calculations. Write for Catalog 221. Then pick out the size, type, trolley style, span and other requirements and place your order.



INSUL-8-BAR CONDUCTOR SYSTEM. A low-cost, flexible system. Enclosed, insulated. Always dependable, indoors or out. Assures complete safety, higher plant efficiency, lower maintenance costs. Trolleys are shoe type. Easy, fast and inexpensive to install, with simple tools. Write for Bulletin M83.



"SHAW-BOX" CABLE REEL. Constructed to eliminate spring breakage. Automatically keeps insulated conductor cable taut. Used on crane and hoist magnets, on soaking pit carriages, rolling mill machinery, machine tools. Available with 50 and 90 lb. pull; drums to wind up to 120 ft. of cable. Write for Bulletin 368.

57D-5

MAXWELL MANNING MM& MOORE INC. TRADE MARK

'Load Lifter'® CRANES

MANNING, MAXWELL & MOORE, INC.

SHAW-BOX CRANE & HOIST DIVISION

382 West Broadway • Muskegon, Michigan

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Other Divisions produce 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

In Canada: Manning, Maxwell & Moore of Canada, Ltd., Avenue Road, Galt, Ontario

Progress with **TITANIUM**

HEAT TREATED TITANIUM

...helps the Hustler spread its wings

The Plane: The U.S. Air Force's delta-winged B-58 Hustler, made by Convair—Fort Worth. To achieve supersonic speeds, designers had to make optimum use of all materials, considering strength, weight, high temperature performance.

The Improvement: 6Al-4V titanium alloy, furnished by Mallory-Sharon, was used in certain applications as a direct substitution for steel for wing fittings bearing heavy loads. This alloy, weighing 44% less than steel, has equal or superior strength for the heat-treated conditions.

The Service Need: The Hustler is the first major application of a new technique that extends titanium usefulness—heat treating. The alloy material is supplied in a medium strength level which permits ease of rough machining. Then the part is heat treated and finished machined to the high strengths desired in service.

To help in this development, Mallory-Sharon service engineers recommended and assisted Convair in establishing qualified subcontractor sources. We furnished bar stock to these companies for evaluation, recommended furnace type, conditions, temperatures, and heating times. We performed mechanical and chemical tests before and after heat treatment, to guide this phase of the program to a successful conclusion.

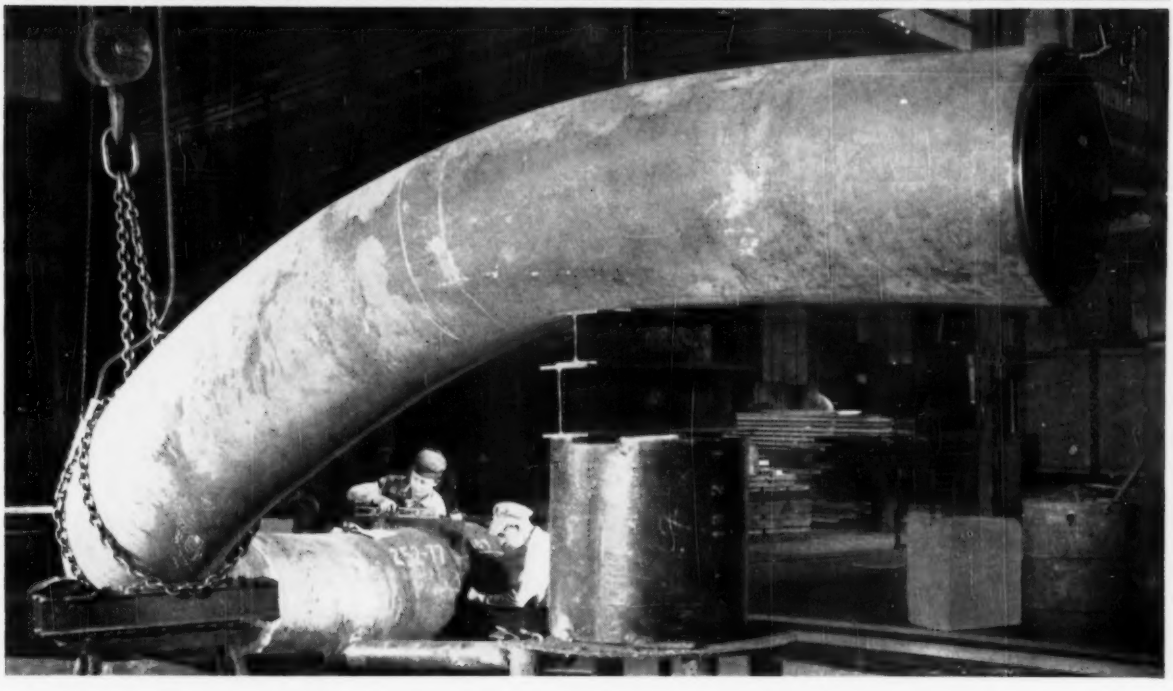
The Result: Improved performance; America's first supersonic bomber. Use Mallory-Sharon's outstanding technical service on *your* applications of this new metal. For information, write Dept. R-5.

MALLORY Ti SHARON

MALLORY-SHARON TITANIUM CORPORATION · NILES, OHIO

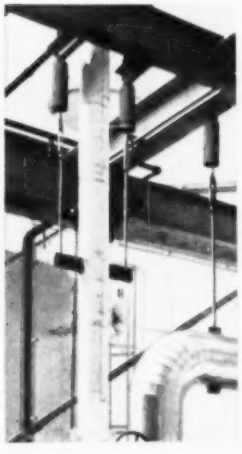
Producers of titanium and titanium alloy sheet, strip, plate, rod, bar, billets

BLAW-KNOX has what it takes—to provide these products and services



Large chrome moly pipe being readied for shipment to new generating station. Making a right angle bend followed by a 24 degree, 18 foot bend in this heavy 27½ inch chrome moly pipe required all the skill and modern facilities of the Blaw-Knox power piping shop. Before shipment, piping is heat-treated and ultrasonically tested with a radar-type device for detection of any defects.

A new Blaw-Knox "6 x 6" Flexibility Matrix Method of computing stresses in power piping systems is now available to consulting engineers, companies, and individuals responsible for the design of power piping systems. By the use of an electronic computer this method cuts calculating time from months to a day; assures full accuracy to six significant figures; and has no limitations on the complexity of the system. Write for further information about our new "6 x 6" Flexibility Matrix Method.



Two-way control over movement of piping is provided by Blaw-Knox functional spring hangers with the patented internal swivel action—shown in this modern outdoor generating station. Our experienced engineers are available to both design and make recommendations for your hanger requirements. To get full information, write for Catalog No. 54.

Each year serious fire strikes one out of every seven manufacturing firms in this country. Be safe. Let a Blaw-Knox fire-protection engineer study your needs — and explain how you can pay for the system on our lease or deferred payment plan. To get more information send for Bulletin No. 2426—"Fire Can Destroy Your Business."

BLAW-KNOX COMPANY

Power Piping and Sprinkler Division

829 Beaver Avenue • Pittsburgh 33, Pennsylvania

Complete facilities for prefabrication and erection of piping systems for all pressures and temperatures . . . complete line of standard and custom-engineered pipe hangers, supports and vibration eliminators . . . complete line of automatic sprinkler systems for standard and special hazards

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"ANYTHING containing IRON or STEEL"

Late Models Popular In New York

Used machinery dealers there find, however, that old equipment is hard to move.

Construction industry, plant expansion giving strong support to current market.

▪ Belated spring weather is warming up the used machinery business in the New York area. The important construction market has blossomed, after delay from a lingering winter. The related plant expansion market is also sprouting. In a nutshell, the market is good to excellent in most areas for good, late model machinery.

Money continues a headache. Generally speaking, dealers can get their price on late models, but not without customer groans. Some dealers report protracted financing arrangements are essential for many sales. But buyers are usually able to get the financing they need from banks and other sources if their overall credit is good.

Most Prices Hold — Price resistance varies with the item, but generally the price structure has held up for new tools. The trade is talking about a recent auction where prices for used equipment passed original purchase prices. But this can be true only of newer tools. Old equipment is hard to move, and price resistance is very strong.

Cranes are a good example of the emphasis on new equipment. Supply is nowhere near demand. One dealer reports he has his finger on a crane, can sell it many times over even before he actualy gets it. But a recent plant liquidation sale had a hard time getting rid of over 35 old-timer cranes. They dated from 1907-1915, and buyers just aren't interested in anything earlier than the 1940's.

Despite the old maxim in the business that "if you can keep it, some day you can sell it," some dealers are wondering if a cut-off date isn't inevitable. Too many tools too old are hanging around the trade too long, they say. Breaking up more of the clunkers for scrap would undoubtedly clear the air considerably.

Press Brakes, Shears Popular— Spring start-up of construction activity has brought strong demand for such items as press brakes and shears. Demand is particularly good for lighter shears in the 3/16 and ¼ in. capacities. Ironworkers are very much wanted, very hard to find, and very expensive when available.

Demand is also very good for horizontal and vertical boring and milling machines, and for toolroom equipment. But here again, it must be late model equipment. Customers just aren't interested in early models.

Coming Auction—Surplus equipment valued at $3,000,000 will be offered in an auction at the American Type Founders Co. plant in Elizabeth, N. J., on April 30, May 1 and 2. Included in the sale will be jig borers, milling machines, turret lathes, cylindrical grinders, internal and centerless grinders, tool and cutter grinders, and a thread grinder. Also for sale are radial drills, single and multiple spindle drills, lathes, saws, gear hobbers, gear shapers and a horizontal boring mill.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS
6' x 3/16" Niagara Initial Type
10' x ½" Kling Pyramid Type
BRAKES—LEAF TYPE
8' x 3/16" Dreis & Krump
12' x ¼" Dreis & Krump
BRAKES—PRESS TYPE
12' x 5/16" Cincinnati—NEW
CRANES—OVERHEAD ELECTRIC TRAVELING

3 ton P&H	58' Span 220/3/60
5 ton Whiting	48' Span 230/3/60 A.C.
5 ton Shaw	56' Span 230 Volt D.C.
8 ton P&H	55' Span 220/3/60
10 ton P&H	38' Span 230 Volt D.C.
15 ton Shepard Nile	52' Span 230 Volt D.C.

CRANE TROLLEY
10 ton P&H Type HMR Crane Trolley. Motors 440/-3/60, Magnetorque Contractor, Panel and Electric Brake, NEW
DIEING MACHINE
60 ton Henry & Wright, Roll Feed, Scrap Cutter 4" Stroke NEW 1950
DRAW BENCH
10,000# Aetna Standard, Length of Draw 44'. Used to draw S.A.E. 1035 Welded Steel Tubing
FORGING MACHINES
1" to 5" Acme, Ajax, National
2" Acme Model XN, Air Clutch, NEW 1954
HAMMERS—BROAD DROP—STEAM DROP—STEAM FORGING—800 lb to 20,000 lb.
LEVELERS—ROLLER
37" Torrington, 19 Rolls 1-31/32" Dia. Backed up
48" Aetna Standard, 17 Rolls 3⅜" Dia.
54" McKay, 17 Rolls, 3¾" Dia.
108" American, 17 Rolls, 4½" Dia.

PIPE MACHINES
2½" x 8" Landis Pipe Cutting, Threading, Beveling
8" x 18" Landis Pipe Cutting, Threading, Beveling
PLANER—PLATE EDGE
35" Southwark Pneumatic Holddown, Motor Driven, Capacity 1½"
PRESSES—HYDRAULIC
200 ton Bliss Hydro Dynamic, 36" Stroke Bed Area 30" x 31"
2800 ton Bliss Hydro Dynamic, 12" Stroke, 60-15/16" Between Columns
4500 Baldwin-Lima-Hamilton Hydr. Forging Press
PRESS—INCLINABLE
#A61½ Niagara 190 ton, 9¾" Stroke Bed Area 32⅛" x 50⅝"
PRESS—KNUCKLE JOINT
1500 ton Verson, 4" Stroke, 48" x 48" Bed Area
PRESSES—STRAIGHT SIDE
Clearing E-1300-42, 300 ton, 24" Stroke, Bed 44 x 36"
Bliss #1018 Toggle Drawing 1550 ton, Strokes 24" and 12" Die Space 60" x 72"
PUNCH & SHEAR COMBINATIONS
Cleveland Style EF Single End, 42" Throat
Cleveland Style G Single End, 60" Throat
Cleveland Style W, 60" Throat
No. 1½" Buffalo Universal Ironworker
ROLL—FORMING
11 Stand Dahlstrom Roll Forming Mach. With Flying Pre-North Press & Flying Shear. Will take widths up to 8"
14 Stand Tishken Model L-M-1, Spindle Dia. 1⅛" 61½" Between Spindles, 3½" Capacity.
ROLLING MILLS
6" x 5" Torrington Wire Flattening Mill Line
9" Bar Mill
10" x 14" Single Stand Two High
12" x 12" Single Stand Two High
12" x 16" Single Stand Two High
16" x 24" Farrel Two Stand Two High
26" x 72" Cold Rolling Mill
44" x 144" Three High Sheet Mill
22" x 40" Three High Sheet Mill
SHEAR—ALLIGATOR
No. 1 Mesta RH LK, Capacity 2" x 12"
SHEAR—BAR
No. 12 Buffalo Armor Plate
Capacity 5" to 15" Beams & Channels
SHEARS—SQUARING
6' x 10" Ga. Niagara No. 672
10' x 10 Ga. Niagara
8' x ¼" Niagara—NEW 1952
12" x ½" Cincinnati
SLITTERS
25" Blake & Johnson
36" Wean Slitting Line
36" Paxson Slitting Line
STRAIGHTENER
Kane & Roach Type B Capy. ⅞" Hex. Flat 4" x 11/32" Flat & Edge 1⅞" x 3/16"
#4F Fenn, Capacity 2¼" Tubing, 15/16" Solid
SWAGING MACHINE
#C½A Fen. Capacity 2¼" Tube 3¾" Solid 10" Die Length Hydraulic Feed. LATE
TESTING MACHINES
20,000# Baldwin Universal Hydraulic
60,000, 100,000, 200,000 Olsen & Riehle Universal
50,000 and 300,000 lb Compression
TUBE MILL
Etna 1K Welded Tube Mill. Cut-off & Transformer Capy. ½" OD 0.28 wall to 2" OD .120 wall

Manufacturing • **A. T. HENRY & COMPANY, INC.** • Equipment

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Telephone COrtlandt 7-3437

Confidential Certified Appraisals
Liquidations—Bona Fide Auction Sales Arranged

Consulting Engineering Service
Surplus Mfg. Equipment Inventories Purchased

HIGH GRADE TOOLS

GRINDING MACHINES
No. 16A2 Blanchard 2 spdl. automatic surface grinder, late.
No. 72 Hanchett rotary surface grinder with 3 heads.
No. 4 Gallmeyer & Livingston univ. tool and cutter grinder.
HAMMERS
No. 6 B Nazel pneumatic forging with motor
No. 6 I Nazel pneumatic forging with motor.
No. 3C Chambersburg self contained, with motor.
Murco 100 lb. upright power hammer, arranged motor drive.
LATHES
126" swing over bed, 96 foot centers Niles, Bement Pond, gear head engine lathe PRT to two carriages.
90" swing Betts Bridgeford late type heavy duty engine lathe headstock mounted on short lathe bed section.
72" swing Betts Bridgeford heavy duty lathe headstock.
Model 6DREL Potter & Johnston mfg. automatic chucking and turning.
No. 5 Gisholt univ. ram type turret lathe, chuck and bar feed.
28" 8' centers Betts Bridgeford axle lathe.
MILLS-BORING, HORIZONTAL, VERTICAL
4-36 Cincinnati hydromatic production mill.
72" King vertical boring and turning with 2 swivel hds. on rail.
4" bar Univ. Tri-Way horizontal boring, milling and drilling.
3¾" No. 5 Defiance horizontal boring, milling and drilling.
3" Universal Tri-Way horizontal boring, milling and drilling.
54" Newton 2 spdl. continuous rotary.
PRESSES
600 ton No. 664 Toledo knuckle joint, coining or embossing.
500 ton No. 1039 Hamilton dbl. crank.
200 ton No. 7 x 72" Bliss dbl. crank straight side.
150 ton Model 60D66 Cleveland straight side double crank.
350 ton No. 18T Cleveland single crank, double action, toggle drawing.
350 ton Elmes self contained hydraulic.
250 ton Williams & White hydraulic.
800 ton Model 2E48-800 Hamilton straight side single crank, air clutch.
160 ton Model 12E Cleveland straight side, eccentric shaft.
750 ton No. 3 National Maxipress, forging.

ASK FOR YOUR LATEST STOCK LIST

MILES MACHINERY CO.
PHONE SAGINAW PL 2-3105
2041 E. GENESEE AVE. SAGINAW, MICH.

REBUILT—GUARANTEED ELECTRICAL EQUIPMENT

SLIP RING MOTORS
Constant Duty—3 phase, 60 cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
1	1000	Whse.	CW	2300	440
1	700	Whse.	CW	2300	390
2	500	Al. Ch.	ARY	2300	505
1	500	G.E.	I-M	2300	450
1	400	Al. Ch.	ARY	2200	505
1	400	Whse.	CW	2200	290
1	350	G.E.	MT-412	2200	450
2	300	Whse.	CW	2300	1200
1	300	Whse.	CW	2200	720
1	250	Al. Ch.	ARY	440	705
1	250	Whse.	CW-1106	2200	485
1	250	G.E.	MT-414	2200	300
1	200	G.E.	I-M	2200	1760
2	200	G.E.	I-17-M	2200	585
1	200	G.E.	I-14-M	2200	490
1	150	Al. Ch.	ARY	440/220	720
1	150	Whse.	CW	4160/2300	585
1	150	Whse.	CW-1000	440	435
1	100	Whse.	CW	440/220	1160
1	100	El. Dy.	EDX612	2300	900
2	100	G.E.	MT-562	440/220	570
2	100	G.E.	I-15A-M	2300	495
1	100	Al. Ch.	ARY	440	430

SYNCHRONOUS MOTORS
3 Phase, 60 Cycle

Qu.	H.P.	Make	P.F.	Volts	R.P.M.
1	2000	Whse.	90	2200	180
1	1750	G.E.	100	2200	3600
1	1500	Whse.	80	2300	514
1	920	G.E.	80	2200/440	300
1	710	G.E.	80	2300	720
1	450	Whse.	100	2200	128.5
3	350	G.E.	100	2300	900
1	300	G.E.	100	2300	720
1	300	G.E.	80	2200	600
2	300	G.E.	80	440	400
2	250	Whse.	80	440	600
1	200	Al. Ch.	100	2200	514
1	200	Al. Ch.	100	2300	360
1	150	G.E.	100	2200	900
1	150	El. Mchy.	80	220	720
1	150	G.E.	100	550	600
3	135	G.E.	80	4000/2200	1200
1	125	G.E.	80	2200	900
2	100	Whse.	80	440/220	1800
1	100	Ideal	80	440/220	900
2	100	G.E.	80	440/220	600
1	100	El. Mchy.	100	440/220	360
2	50	G.E.	80	2200	600

T. B. MAC CABE COMPANY
4302 Clarissa St., Philadelphia 40, Penna.

Cable Address	Phone
"Macsteel" Philadelphia, Pa.	Davenport 4-8300

- 2000# Chambersburg Pneumatic Forging Hammer Late Type, Serial 20CH392L7.
- 2" Wallace Hydraulic Pipe Bender
- No. 7 Ajax Forging Press, 700-ton capacity
- 3—2-ton Denison Auto. Hopper Feed & Index Table Hydr. Multipress
- 25 Transformer and Generating Arc Welders
- 2500 lb. Model E Chambersburg Steam Drop Hammer, New 1944
- 6' x 10 ga. Cincinnati Squaring Shear, all gauges ¼" x 8' Pexto & Wilcox Gate Shear, 20" throat
- 4" National High Duty Upsetting & Forging Machine, air clutch, also one with regular clutch, also 1", 2", 3" air clutch
- Williams White Bulldozers from 5-ton to 300-ton
- Landis Landmaco and other Landis Threading Machines
- Single & Double End Punches
- No. 3 Motch & Merryweather Saw, with Saw Grinder

BOLT, NUT AND RIVET MACHINERY, COLD HEADERS, THREAD ROLLERS, THREADING MACHINES, TAPPERS, COLD BOLT TRIMMERS, SLOTTERS, HOT HEADERS AND TRIMMERS, COLD AND HOT PUNCH NUT MACHINES.

DONAHUE STEEL PRODUCTS CO.
1919 W. 74th Street, Chicago 36, Ill.

BRAKE MOTORS

- 30 HP Master Gearmotor 56 RPM Exp Prf Sterns Magnetic Brake. 220/440/3/60.
- 20 HP Westinghouse CS, TEFC, 1160 RPM 404s. Sterns Mag. Brake. 440/3/60.
- 2 HP General Electric Gearmotor 71 RPM Integral GE Disc Brake. 440/3/60.

F. H. CRAWFORD & COMPANY, INC.
30 Church Street New York 7, N. Y.

BENNETT MACHINERY CO.

NEW BATH PRESS BRAKES

10' x ¼"	No. 150-10,	150 ton,	12' bed
10' x 3/16"	No. 120-10,	120 ton,	12' bed
10' x 8 ga.	No. 100-10,	100 ton,	12' bed

375 Allwood Rd., Clifton, New Jersey
Phone ?Recruit 9-8996 N. Y. Phone LOngacre 3-1222

Fellows Str. Line Generators.
3" Gleason Str. Bevel Gear Gens.
Barber-Colman Type A Hobber, 1937.
Red Ring 3" Gear Shaver, 1942.

D. E. DONY MACHINERY CO.
4357 St. Paul Blvd. Rochester 17, N. Y.

CALL Curry! FOR SURPLUS STEEL PLANT EQUIPMENT

AVAILABLE EQUIPMENT

1—**Propane Gas Plant, 60,000 Gallons Storage Capacity,** complete with Pumps, Valves, Heat Exchangers, etc.

1—**Steel Frame Building, 145 ft. Wide x 1,060 ft. Long, 2 Bays,** complete with Six 10 Ton DC Cranes.

1—**36" Wean Slitting Line**—Capacity 5 Cuts in 3/16" Material, complete with Uncoiler, Slitter, Recoiler, and Misc. Spare Parts—New 1946.

Write for the Curry List of available steel plant equipment

1—**2000 H.P., G.E. Slip Ring Motor** for 3 Phase, 60 Cycle, 2200 Volt Current @ 237 RPM, complete with Controls.

1—**2000 H.P. Mesta Gear Reduction Unit Ratio 10 to 1.**

ALBERT Curry & CO. INC.
STEEL PLANT EQUIPMENT
941 OLIVER BUILDING · PITTSBURGH 22, PENNA.
Phone ATlantic 1-1370

1—**12" 3-Stand 3-Hi United Bar Mill—Top and Bottom Screw,** complete with Pinion Stand and driven by 750 H.P. Motor, 230 Volt DC.

1—**144" x 3/16" Stamco Power Squaring Shear,** complete with Holddown.

1—**40 Ton Morgan Ladle Crane,** 50 ft. Span. DC Current.

1—**#4 United Sheet Bar Shear, 26" Knives,** complete with 30 H.P. DC Motor and Tables.

1—**500 H.P. Mill Drive,** consisting of a 500 H.P. G.E. Synchronous Motor 327 RPM, and a 500 H.P. Farrell Birmingham Reducer, Ratio 10 to 1.

Cable Address: CURMILL-PITTSBURGH

RE-NU-BILT
GUARANTEED
ELECTRIC POWER EQUIPMENT
A. C. MOTORS
3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
2	1750	G.E.	M-579BS	4800	1800
1	1500	G.E.	MT	6600	1187
1	1100	F.M.	OVZK, B.B.	4800	1800
1	800	G.E.	MT	2200	292
1	750	G.E.	MT-573	2200	1150
1	700	A.C.		2300	500
1	500	Whse.	CW	550	350
1	400	Whse.	CW	440	514
1	350	Cr. Wh.	Size 71	208/416	1765
1	350	G.E.	IM-17A	440/2200	720
1	250	G.E.	MT-424Y	4000	257
1	250	Cr. Wh.	Size 290	2300	350
1	250	Al. Ch.		550	600
1	200	G.E.	IE13 B.M.	220/440	1760
1	200	G.E.	MT-557Y	220/440	1760
1	200	Cr. Wh.	30QB	440	505
1	200	G.E.	IM	440	435
3	200	G.E.	I-17AM	2200	435
1	200	G.E.	IM	2200	580
1	150 (unused)	Whse.	CW	2200	435
1	125	A.C.		440	865
1	125	Al. Ch.		440	720
1	100	G.E.	IM-16	2200	435
1	100	G.E.	IM	440	600
4	100	A.C.	ANY	440	695

SQUIRREL CAGE

1	800	G.E.	KT-573	2200	1180
1	650	G.E.	TT-550BY	440	3570
3	500	Whse.	CS-1216	2200	500
2	450	Whse.	CS-1420	2300/4150	354
1	400	G.E.	IK	2200	500
1	300	G.E.	KT-759A	2300	1775
1	200	G.E.	IK-47	440	580
2	200	G.E.	KT-557	440	1800
1	150/75	G.E.	IK	440/900	450
1	150	Whse.	CS8568	440	880
1	150	Whse.	CS	440	580

SYNCHRONOUS

Qu.	H.P.	Make	Types	Volts	RPM
1	7000	G.E.	ATI	2200/6600	600
1	4350	C.W.	3501SL4000	6900/13800	514
1	2850	Whse.	Sp.f	2300/4600	514
1	2800	Whse.	Sp.f	2300	720
1	2000	Whse.		2300	129
2	1750	G.E.	ATI	2300	3600
1	735	G.E.	ATI	2200/12000	600
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No. 1L Gisholt-Universal, m.d., 1943
No. 1, 2 Cincinnati Acme Full Universal, m.d.
No. 1A Warner & Swasey, m.d.
No. 2A Warner & Swasey, m.d., preselector head, late
No. 2F Foster Fastermatic, m.d., Timken
No. 2L Gisholt Universal, m.d., latest type, '45
No. 3 Gisholt, m.d., 1942
No. 3 Jones & Lamson, m.d., 1943
No. 3A Warner & Swasey, m.d.
No. 3L Gisholt, m.d., 1942
No. 3F Foster Fastermatic, m.d., Timken
No. 4 Midland Universal Ram Type, m.d.
No. 4A Warner & Swasey Universal, m.d., chucking, 1939
No. 4L Gisholt Universal, m.d.
No. 4FU Foster Fastermatic, m.d., latest, 1945
No. 4R Libby Ram Type, m.d., in base
No. 5 Gisholt Ram Type, m.d.
No. 5 Bardons & Oliver Ram Type Universal
No. 5H-8 Libby, m.d.
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12' 14 ga Niagara Squaring Shear, MD, AC
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1—INGERSOLL RAND CAMERON Centrifugal Pump & Motor, Model No. E3-EV, Serial No. A433286, with 100 HP Induction Motor; Model 17470, 3 phase, 60 cycle, 440 volts, 1755 RPM. Pump: GPM. 450, 1750 RPM, 462' Head, including 100 HP. Electrical: GE Automatic Compensator CR-7051 K1, 3 phase, 60 cycle, 440 volts. Year Mfg. 1943.
1—INGERSOLL RAND CAMERON Pump & Motor, Size 4HMT-4, Serial No. 01443518, 100 HP G.E. Motor, 440 Volts, Type KT-114A, #5168695, Form EL, 40 degrees, Model 17470. Pump: 450 GPM, 539' Head, Hydro Test 1200, 1750 RPM. Electrical: G.E. Automatic Compensator CR-7051 K1, 3 phase, 60 cycle, 440 v.
1—INGERSOLL RAND CAMERON Single Stage Suction Centrifugal Pump, Size 4RT-4, Serial No. 04523068, 200 HP Reliance Motor, 3550 RPM, 440 volts, Form 0, #71344A1, 239A—Code G, Frame A-50586, 40 degrees. Pump: 450 GPM, 3560 RPM, 1100' Head, 1200 Hydro Test, Year Mfg. 1952. Electrical: G.E. 151-200 HP Automatic Compensator, 3 phase, 60 cycle, 440 volt, CR-7051, Dif. with Enclosure 8B max. Amps 600.
1—WORTHINGTON Pump, Style 5KF365DA7, Serial No. 1038687, Size 1¾ x 4, 30 GPM, 1200 lb. capacity 25 HP G.E. Motor #5334, 1760 RPM. TEPC 220/440, 260 RPM, #5584203, Type KF, Model 14W168M44, Year Mfg. 1941.
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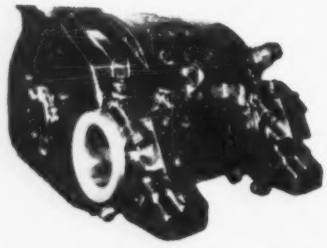

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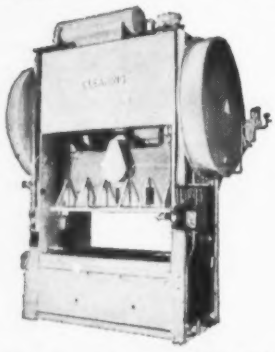

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Graduate M.E., mid-thirties, with outstanding performance record. At present with nationally known concern in metal working industry. Broad experience in development design and manufacturing. Resourceful planner and organizer. Willing to relocate.
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U.S.I. INDUSTRIAL CHEMICALS CO.
Division of National Distillers Products Corp.
99 Park Avenue, New York 16, N. Y.

METALWORKING BRIEFS

Steelmen from India Will Study Here

Training in the management and production methods of the American steel industry will be provided for 200 engineers from India under a Ford Foundation grant of $1,500,000. The foundation set up the program after discussion with the Committee on Foreign Relations of the American Iron and Steel Institute, the Carnegie Institute of Technology and the Indian Ministry of Iron and Steel.

McDonald's Margin Below 2 to 1

David J. McDonald was re-elected president of the United Steelworkers by less than a two-to-one majority, a final tally indicates. Results released by the union give McDonald 404,172 votes as against 223,516 for his opponent, Donald C. Rarick. Rarick has asked for a local-by-local breakdown of the vote.

Canadians Begin Iron Ore Project

A $100 million iron ore development by the Quebec Cartier Mining Co. is scheduled for an early start. The project, described as the second largest of its kind ever undertaken in the area, will be on large, low grade iron ore deposits a few miles west of Sept-Iles in Northeastern Quebec.

More Goods Will Go to Red China

Sharply increased flow of goods to Red China from free world countries other than the U. S. can be expected shortly. American willingness to discuss lowering the bars to trade is the current signal for relaxation. Japan and the United Kingdom have been strongly urging such a step as an aid to their economies.

Titanium Mining Slated for Florida

Union Carbide and Carbon Corp. will begin mining titanium bearing ore on an island off Florida in the spring of 1958. Construction of a processing mill and associated facilities will begin shortly on Amelia Island, 30 miles northeast of Jacksonville.

Shipbuilding Boom Is Here

Maritime Administration officials reveal that 119 commercial ships and 57 Naval vessels are under construction or on order in the U. S. Their combined cost will total about $2.7 billion. It is described as the biggest backlog in peacetime history. The commercial ships include 105 tankers, five passenger ships, and nine vehicle carriers.

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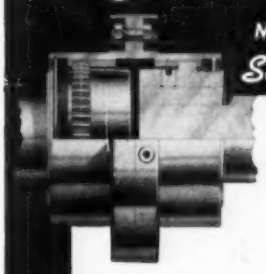
HOW CAN YOU AFFORD ORDINARY GEAR TYPE COUPLINGS WHEN

AJAX New 3-Degree DIHEDRALS

HANDLE 3-DEGREE MISALIGNMENT at the Same Low Price?



Cut-away view showing arrangement of specially designed gears and location of lubrication seals.

With ability to handle angular and offset misalignment . . . with minimum backlash . . . with perfected lubricant sealing . . . with long life,—AJAX Dihedral Couplings have made ordinary couplings obsolete.

And now AJAX adds this new 3-D Self-aligning Dihedral Coupling at prices competitive with ordinary gear type couplings.

AJAX 3-D Dihedral Couplings will handle misalignment up to three degrees between the driving and driven shafts of direct connected machines. AJAX patented Dihedral tooth design makes it possible to have close tooth clearance with no dependence on backlash for handling misalignment. AJAX 3-D couplings are designed for NEMA motor shafts using standard keys.

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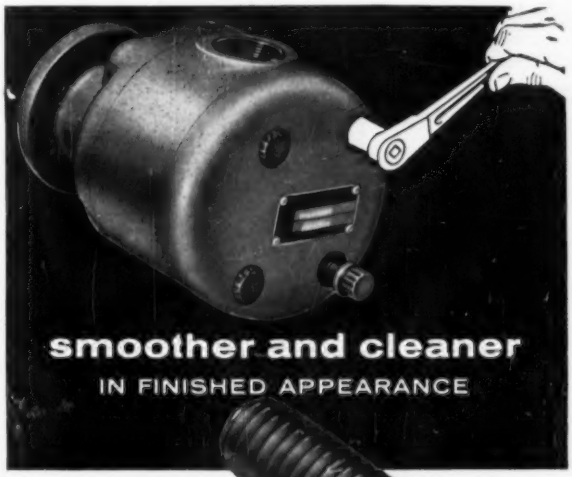
WESTFIELD, N.Y.



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The forging well illustrates Bethlehem's capacity for heavy work of this nature. Bethlehem shops are fully able to produce the largest, heaviest pieces ever required. But let us emphasize that we're equally well set up for the smaller items, including all types of drop, upsetter, and specialty forgings.

Whenever we can be of service to you, please call or write. You will find our engineers particularly helpful and cooperative. They'll work with you all the way on any forging problems you may have.

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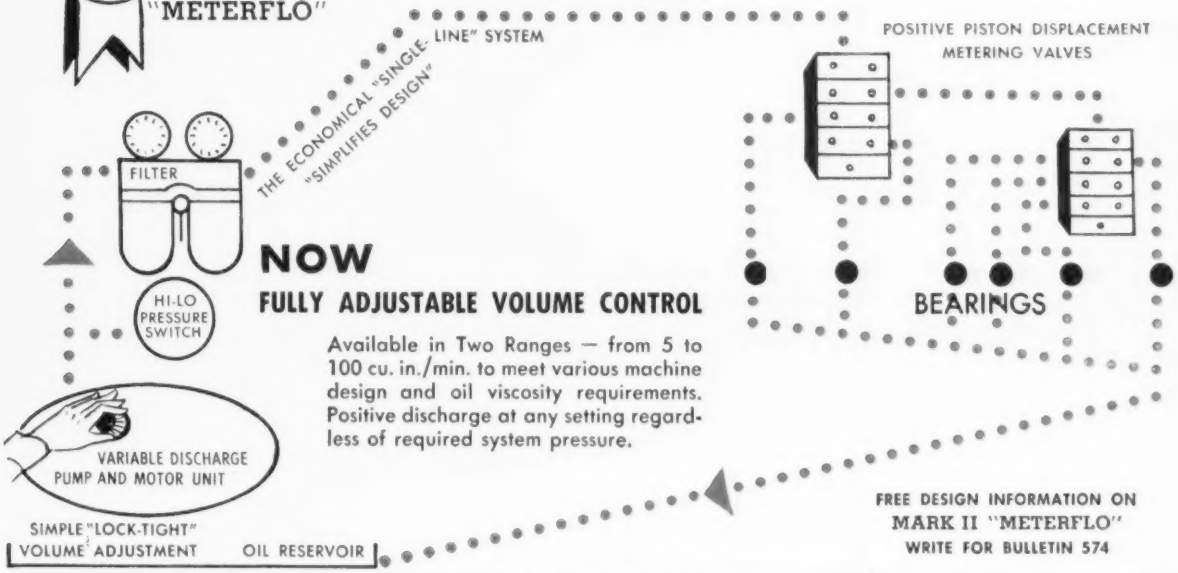
POSITIVE OIL FLOW TO EVERY BEARING UNDER PRESSURE



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FULLY ADJUSTABLE VOLUME CONTROL

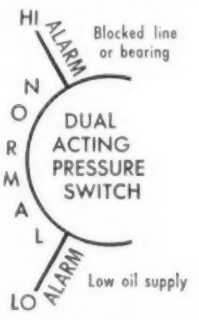
Available in Two Ranges — from 5 to 100 cu. in./min. to meet various machine design and oil viscosity requirements. Positive discharge at any setting regardless of required system pressure.

FREE DESIGN INFORMATION ON MARK II "METERFLO"
WRITE FOR BULLETIN 574

PLUS CALIBRATED DUAL PRESSURE SWITCH EQUIPMENT

Compact dual-acting pressure switch now includes calibrated adjustment for simple and ready adaptation to meet all field conditions. "Pressure-dampened" switch and gauge equipment—for longest equipment life and elimination of any momentary "false" pressure signals.

Wide normal operating range assures positive metered quantity **regardless of length of line or varying bearing resistances.**



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- Constant positive pressure feed regardless of change in temperature or oil viscosity.
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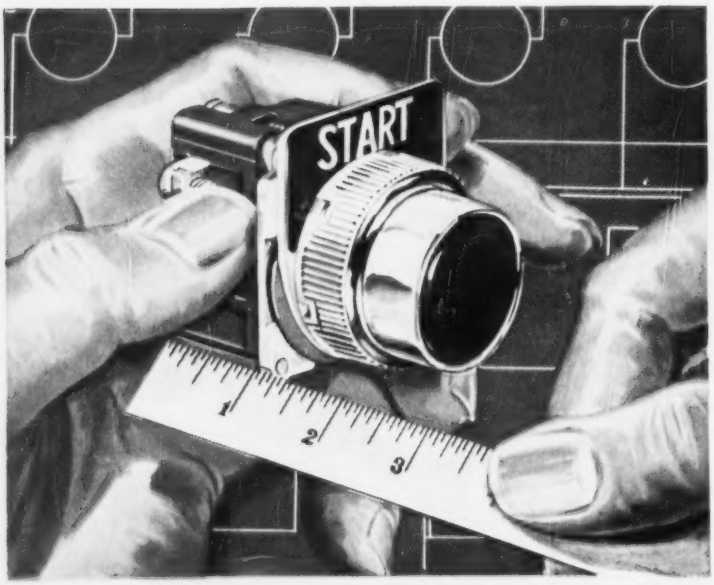
For further economy, non-adjustable units also available.

TRABON ENGINEERING CORPORATION
28815 AURORA ROAD SOLON, OHIO

☆ ☆ ☆

Machine designers say these new heavy duty pushbutton units have no equal and prove it by adopting them as standard equipment



These are the world's smallest heavy duty pushbuttons. They require a behind-the-panel depth of only 1 3/32". This is 40% less space than needed by the next smallest units on the market. Double-pole contact blocks are available in all combinations of normally open and normally closed contacts. Each control circuit is electrically and mechanically isolated from the other. Each circuit is clearly identified and all terminals are color coded. Rapid on-the-job circuit additions are obtained by stacking contact block on contact block.

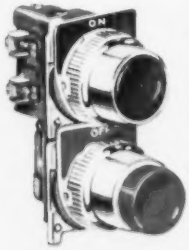
☆ *they install easier*

☆ *they work better*

☆ *they last longer*

Design engineers are quick to recognize that these new heavy duty pushbuttons have *everything*. There is nothing on the market like them. They are amazingly compact to require the least back-of-panel depth. They are one-hole mounting and they are oil tight. They easily provide for as many as eight separate control circuits per pushbutton, eight completely isolated heavy duty contacts either normally open or normally closed. The buttons may be flush type, the extended type or with mushroom heads. They can be black, red, yellow, green or gray. See the new one-button control station, C-H Roto-Push. See the easiest-to-install maintained-contact pushbutton attachment and the means for padlocking any of the standard pushbuttons. There are both knob and key operated selector switches in this complete line. Also matching indicating lights and the new automation safety light, PresTest. Be sure you have complete information *now*. Write today on your company letterhead for a copy of the new Cutler-Hammer Pushbutton Handbook Pub. EL-178. CUTLER-HAMMER, Inc., 1325 St. Paul Ave., Milwaukee 1, Wisconsin.

These pushbuttons may be flush type, extended type or with mushroom heads . . . in a wide range of colors for quick control identification. Standard, large, and jumbo size legend plates fit every type of operator and indicating light in the entire line.



A maintained-contact pushbutton assembly that saves more than its entire cost by installation savings. New attachment with its pushbuttons mount in minutes; no fussy adjustments. Neither alignment nor spacing of units is critical. Pushbuttons will not bind or stick; always operate perfectly.

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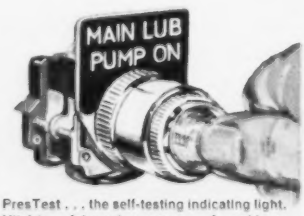
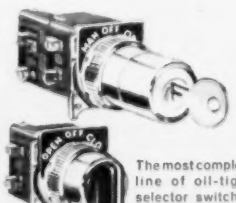
MOTOR CONTROL
C-H

The C-H one-hole mounting oil-tight indicating lights with new wide-visibility lenses are the most visible from all angles by actual light meter tests. Available in either transformer or resistor types. Lenses offered in six different colors.



PresTest . . . the self-testing indicating light. Vital to safety and proper use of machines, particularly in automation. PresTest now permits instant proof light is NOT off because of burned-out bulb. Merely pressing on the light lens disconnects bulb from its normal circuit and checks it on a test power supply. Resistor and transformer types available.



The most complete line of oil-tight selector switches on the market. Key or knob operated; two or three position. Positions may maintain contact or have spring return. Three standard contact blocks provide a wide range of circuit combinations with the use of just a single block. Unlimited circuitry by adding blocks.

Roto-Push . . . the one-button control station. One Roto-Push can provide all the control functions for which two or three separate pushbuttons would be used normally. Available in a wide range of selector and button operators. Roto-Push simplifies panel design and saves installation time to cut costs. Improves machine-operator efficiency.